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Working with OPERA and MOZILLA

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Wish List for the year ahead



Maulik Jasubhai

Every year in our anniversary issue, I am expected to write about our vision and plans for the coming year. This year, I have decided to do away with the Vision mumbo jumbo! Instead, here's my Wish List for the computer industry in India:

- 1. Computers for everybody:** Technology giants have promised us, many a times, to bring and build an affordable computer. While there has been some progress on this front, the real ticket is the Rs 10,000 computer.
- 2. Software in OUR languages:** Why is it that all the software giants (read Microsoft), can invest more than \$100 million in developing Chinese language versions and not make a slightest of dent in putting together a 'local' language software for India?
- 3. Internet for the masses (Finally!):** I hope that in 2003, the Internet—infrastructure efforts such as DSL and satellite; content such as Web sites, e-mail and other services; access and usage by wider groups—will finally begin to work.
Huge sections of our people do not, yet, have access to Internet. Until now, limited access also caused limited content. I hope that in 2003, the Internet will grow into a real World Wide Web, and finally begin to contribute to solutions for the many problems of poor education, promote economic growth and make us as a truly 'technology-enabled' country.
- 4. Substance, NOT Speed:** How much faster do you need your processor to be to load MS Word? Enough! Can someone please ask the technology industry to wake up and smell the coffee?! We have all the speed we need; now can we have software and content and connectivity to actually use that speed?! Moore's law, RIP. What we really need are user-focused innovations. Tech industry has been the fountainhead of innovations (heck, the auto industry, after a century, is still stuck on the internal combustion engine). But we need innovations for the 'Human Being', not for the number-crunching monsters.

5. Surprise ME!

Tell me your Wish List at maulik44@jasubhai.com

We promise to continue to work tirelessly to make your wishes come true.

A handwritten signature in black ink, appearing to read 'Maulik Jasubhai'.

Maulik Jasubhai
Publisher and Executive Director, Jasubhai Digital Media

team

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>> Yo



ur Technology Navigators

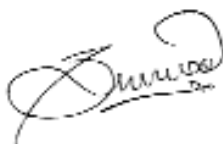
Social software

Social software make a virtual space useful for people who interact either directly by engaging in conversations, or indirectly where the consequences of people's actions and choices make it easier for other people to pick up the thread. Software such as blogs and forums are typically organised by time, while others such as Wikis and Amazon's recommendations are organised by topic.

The buzz is led of course, by tools such as Web log or blog software. Blogs are mostly a one to many communication medium, with the blog owner writing about whatever catches his fancy at any convenient time. The heavy cross-linking that is common among blogs, form communities of interest. By travelling these links, any chance visitor could discover a network of active people whose interests match his own. This spontaneous formation of communities exhibited by blogs is one of the key characteristics of social software—though less permanent networks can be formed over group Instant Messaging. Instead of the top-down mandated nature of a newsgroup or chat room typically run by a moderator, or channel operator, loosely connected blogging communities are formed and act purely by associations and reputation built within the community.

Similarly, an experimental tool from Microsoft called 'Three Degrees' does just that—help groups of people share discussions, music and other activities.

The power of a network grows exponentially with the number of connections. The momentum behind software that facilitates emergent networks, and let you carry your own social network online, in mediums that suit your needs is building. With the right tools becoming available, it is about time we reach out and connect with technology.



Sumod_hajela@jasubhai.com



Sumod Hajela
Assistant Editor

“After the spectacular rejection of 'old' style IRC and Usenet groups, social software as a class of tools is now gaining mindshare on the Internet.”

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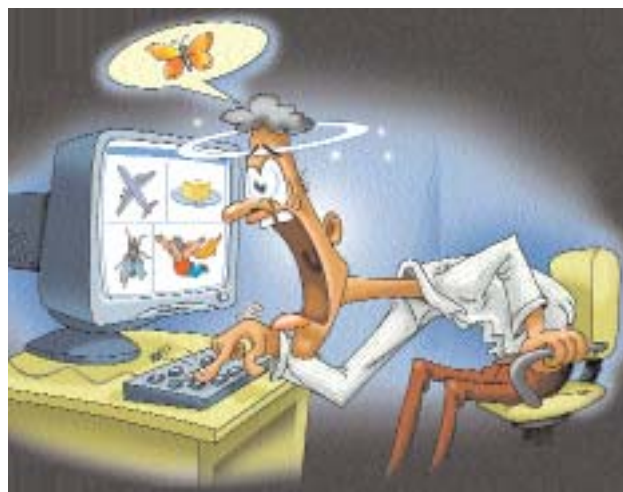
224 ▲ Pretty. Easy. Linux. Have a great desktop!

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So, you can talk to your computer in the near future. The question is: Will it understand?



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Reviewed this month

HARDWARE

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- Artis S880
- ASUS A7S266
- BenQ DVP-1648A
- Bose MediaMate Computer Speakers
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- iball The King
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- UMAX Astra 2500
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SOFTWARE

- Office 2003 Beta

ON THE CD

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interactive

HIGHLIGHTS

Airport Tycoon 2

 Type: Trial Size: 59.8 MB
 Playware\Arena\Games

Aqura8

 Type: Trial Size: 1.44 MB
 Mindware\Software\Office

DVD Movie Factory

 Type: Trial Size: 38 MB
 Mindware\Software\Multimedia

Magic Utilities 2003 2.10

 Type: Trial Size: 0.87 MB
 Mindware\Software\System

Mass Downloader

 Size: Trial Size: 0.98 MB
 Mindware\Software\Internet

Postal 2

 Type: Trial Size: 123 MB
 Playware\Arena\Games

Restaurant Empire

 Type: Trial Size: 142 MB
 Playware\Arena\Games

Super Collapse 2

 Type: Trial Size: 1.99 MB
 Playware\Arena\Funzone

SuperShredder 1.01

 Type: Free Size: 0.15 MB
 Mindware\Software\System

Toolfish Utility Suite 2.0b

 Type: Trial Size: 1.45 MB
 Mindware\Software\Internet


KNOW YOUR CD

PLAYWARE\ARENA

If it's gaming that matters to you, then this is the one section that you should start off with. If you have the enthusiasm to game, we have the games for you!

With four sections that contain all the holy grail of gaming every month, this is the section that is meant for all people with that instinct to play and ace through their games! Within Arena, look at the Games section for all the latest and



hottest game demos. This month we feature *NASCAR Racing 2003 Season*—the hot-rod racing sim that has a legendary fan following the world over. Look at *Airport Tycoon* and *Restaurant Empire*—two sims that

will have you building your empires! And we also carry *Postal 2*, the game that already has a name as a rocker! So when are you goin' postal, dude?

MUST TRY SOFTWARE

NASCAR Racing 2003 Season

NASCAR Racing 2003 Season will immerse you in the most captivating NASCAR racing experience available on the



PC. Tracks come to life as dirt, debris and oil buildup on the windshield, clouds cast shadows and flags wave in the breeze, giving players the most engaging driving experience available for the PC. With extraordinary 3D graphics, an explosive sound system, driving lessons and track tutorials, and 2003 drivers, teams and paint schemes, get ready to enjoy the the legacy of award winning NASCAR Racing games. Get ready to burn rubber and take control to lead in the NASCAR championships!

Size: 119 MB Type: Trial
 Playware\Arena\Games

CD Architect 5.0

CD Architect provides the most precise audio CD mastering and burning tools available. Arrange your project using simple drag and drop operations. Produce complex crossfades and DJ-style megamixes. Generate multiple takes of a song before burning. Create live-style CDs with audio in the time between tracks,



apply volume envelopes and even create hidden tracks. CD Architect supports a long list of drives, including many FireWire and USB devices.

Size: 16 MB Type: Trial
 Mindware\Software\Multimedia

Mozilla 1.3 for Windows

Mozilla is an open source Web browser, designed for standards compliance, performance and portability. It is continuously updated and supported by an enthusiastic community of developers. Development and testing of the browser is provided via discussion forums, software engineering tools, releases and bug tracking. New for this release are junk mail and newsgroup filters besides the usual fixes for performance, standards compliance and site compatibility.

Size: 12 MB Type: Free
 Mindware\Software\Internet



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Size: 0.39 MB
Mindware

Unreal II: The Awakening
Size: 153 MB
Playware

WEB SPECIAL

Net Nasties

The Internet is the best thing that ever happened to those who like to stay connected. But every Jekyll has a Hyde...



news feed

DIGIT JUNE 2003

hypothesis

Athens PC

■ What Is It?

The Athens PC is a prototype PC, which is considered by HP and Microsoft to be the future business desktop PC. With all communication media, including voice, video, and text converged.

■ How does it work?

Athens PC aims to shift from designing isolated hardware and software components to a whole system approach. It provides unified communication through integrated telephony and RTC (Real Time Communications). It includes integrated telephone, controls for telephony, convergence of a variety of telephony interfaces such as PSTN, PBX and cellular interfaces. The display is a high resolution, wide, 16:10 aspect ratio flat panel.

■ What does it do?

Athens PC switches between on and standby mode in less than 2 seconds, thus you don't wait for the PC to boot up every time. In case of power failures, the PC goes into a hibernate mode, saving important data. Controls on the keyboard are organised in logical groups, including media transport, system-wide volume and mute, notification and telephone controls. The integrated telephony has physical buttons and displays, so that the phone features can be seen and used without turning on the computer. It features high-quality audio and operates silently.

A grid effort

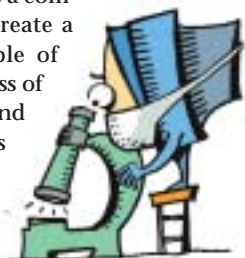
A new initiative has been taken by D2OL (Drug Design and Optimization Lab), to test drugs that might help to cure SARS. The project uses a computer's idle time to create a supercomputer capable of testing the effectiveness of potential drugs. Around 15,000 computer users have downloaded the project software.

Grid computing can screen potential drugs much faster than laboratorial researchers. They are used to analyse different compounds as candidates for the suitable drug. After the compounds are pinpointed, they are ranked in order of how likely they are to work, and then tested in that order.

The American Diabetic Association has also signed

Gateway for its grid computing Service. The ADA will use 'Gateway's Processing On Demand' solution, backed by United Device's Grid MP Alliance platform, to accelerate diabetes research. The platform with 7,000 computers will run software to help the ADA analyse clinical programs and treatments, develop clinical practice guidelines, study the efficiency of care processes, set priorities and plan its research.

The Gateway Grid can produce more than 11 TFLOPS (trillion floating point operations per second) at peak capacity.



ILLUSTRATIONS: Farzana Cooper

Crystal ball monitor

The Perspecta 3D System is a 360-degree spatial display, powered by the Perspecta platform and application software. In this system, the screen is a rotating disk that is capable of producing light at any point it passes through. The result is a real 3D representation of the object, which can be viewed from any angle, without the need for any special goggles. The display illuminates 100

million volume pixels, or 'voxels', using Actuality's patented technologies, within a transparent Lexan dome.



Recently, Actuality Systems announced its first European sale to ENEA, the Italian National Agency for New Technologies. The Perspecta 3D System will be used as part of the centre's applied research and development work in 3D imaging of scientific data.

Karnataka signs MoU with IBM

The Karnataka government and IBM signed a Memorandum of Understanding on 9th May, to advance e-learning initiatives based on Open Source technology. IBM will work with BITES (Board of IT education Standards) and IIT, Hubli, to develop an e-learning platform and to develop IBM centre of Excellence, which will be devoted to open source software.

Steve Hills, Senior Vice President, IBM, said that with this, IBM would leverage local talent and bring existing syllabus, faculty and students on par with the IT emerging technologies. The e-learning portal will entail content, faculty training, mentoring of students and application developments. The courseware will be based on Linux and Eclipse OSS (Open Source Software) and work on the development of technologies, such as Middleware Components, Device Drivers, and Real Time Applications etc.

snapshot

30,674,408
The total number of .com, .edu, .net, .org and .co.uk domain names worldwide:

Source: Domainstats.com



■ NEC launched the MobilePro 900—a Windows CE 3.0-based device is aimed at the enterprise ■ Windows XP 64-bit Edition will require a minimum of 1GB of memory

Everybody's doing the DMCA

Under the Digital Millennium Copyright Acts (DMCA) section 512, a copyright holder can send a 'take-down' notice to an ISP whose network is used for distributing copyrighted music and other files. The Recording Industry Association of America (RIAA) sent 24 notices, without confirming that the files were available for download. CNet News reported that the RIAA

withdrew the notice sent to the Penn State University by a temporary worker and apologised for the incident.

In another case, an ISP called Speakeasy received a notice stating that a certain user's Web site was illegally offering approximately 0 sound files for download, including songs



by artistes such as Creed. Speakeasy reverted back and was satisfied with their timely response.

Even after such incidents, the RIAA continues its threatening stance. One of their ideas is to warn users against file swapping by using the instant messaging found within peer-to-peer software.

DVD next

Toshiba and NEC have developed a prototype of what they tout as the next generation of DVD technology. The prototype was unveiled at Optical Data Storage 2003 show, held in Vancouver. This technology differs from the Blu-Ray format.

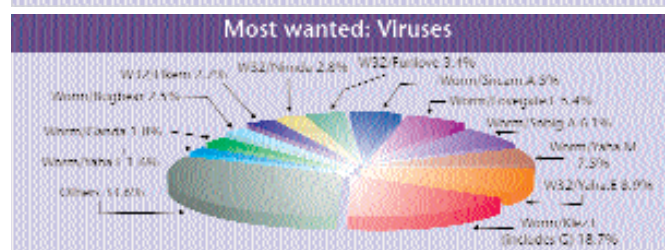
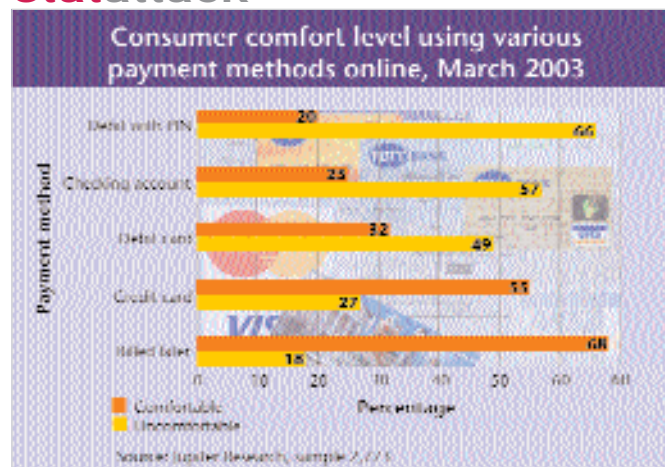
The disc is based on shorter length blue lasers as com-

pared to current red-laser technologies, but it would be easier to make backward compatible with current DVD technology. Current production facilities would require comparatively lesser modifications to mass-produce the new discs called Advanced Optical Disc (AOD). The proposed format utilizes the same

disk structure used in current DVDs—back-to-back bonding of two 0.6 mm thick, 120 mm disks. Toshiba claims to have stored 36 GB of data on a dual-layer, single-sided, read-and-write disk.

Toshiba and NEC are working with an association of 215 companies to define the future format.

statattack



Source: Central Command

Son for sale

A man, who offered his son for sale on the Internet in jest, was in trouble when a concerned Web surfer informed the police. Alex Wilson of Scotland placed an advertisement about 2 years ago to tease his son Liam, who was then 5 years old. After placing the advertisement, he forgot about it until this Canadian woman spotted it on a Web site selling bicycles and prams, and informed the police. The advertisement read, "Hyperactive kid for sale, good at vacuuming, not great at washing dishes because he's too short. Guaranteed to annoy. Five pounds or nearest offer."

Alex had to remove the advertisement from the site.

redalert

Freaky fizz

A new worm called W32.HLLW.Fizzer@mm arrives as an e-mail attachment having a .com, .exe, .pif or .scr extension. It sends itself to all windows address book contacts, independent of the e-mail software. It also spreads itself via the KaZaA file-sharing network. Fizzer has a key logger that can be used to steal passwords and other sensitive data. This sneaky worm attempts to disable your anti-virus software and updates itself automatically. It can be remotely controlled via IRC and AOL's messenger for distributed denial of service (DDoS) attacks. All versions of Windows are at risk. Check for the latest virus updates or visit <http://www.symantec.com/avcenter/venc/data/w32.hllw.fizzer@mm.html> for a removal.

Maax hit

W32.HLLW.Maax.B@mm, is a worm that spreads through e-mail. It uses MAPI programs to mail itself to all your contacts. The e-mail contains a subject from the worm's predetermined list, and contains a file called Tca.exe. It attempts to disable any anti-virus and then deletes several system files. It also makes modifications to your system.ini and win.ini files. If it succeeds in modifying the autoexec.bat file, your C and D drives may be formatted when you restart. Visit <http://securityresponse.symantec.com/avcenter/venc/data/w32.hllw.maax.b@mm.html> for a removal.

Postal too

A man in Cleveland, USA killed a postgraduate student, and injured two others by firing in rage, when his Web site destroyed by a hacker. Biswanath Halder, believed that Shawn Miller, a school computer lab assistant hacked his site and destroyed his life's work. Halder tried to convict Miller in the civil courts, and made numerous complaints to the university president, the campus police, the Mayor of Cleveland, the FBI and even the US House and Senate Judiciary Committees.

Halder was a loner and was unable to get a job for last 15 years. He used to sue companies that did not take him. He thought he possessed the secrets to peace and prosperity and shared his secrets through his Web site. He said in court, "I try to solve mankind's problems through the Internet. In a few seconds, the evil man wiped out everything that it took my lifetime to create."

Halder has been living on disability pension for some years and thus was unable to afford psychiatric treatment.

snapshot

There are approximately **38,118,962** Web sites on the WWW. **57.62%** of the Web sites run on Apache Web server while **31.87%** use Microsoft IIS

Source: netcraft, 2002

'X' marks the box

Keen on boosting the sales of the Xbox, Microsoft announced new additions and improvements for the game console just before this year's Electronic Entertainment Expo (E3) show. The announcement included exclusive game such as Halo 2, Project Gotham Racing 2 and Crimson Skies: High Road to Revenge coupled with an Xbox version of Counter Strike. All these have innovative online gameplay modes.

New features for its online gameplay system Xbox Live are also being introduced. It now has the ability to page a friend's mobile device with an invitation to play, and even a place to meet online and use voice-chat. Microsoft is hoping to have at least a 100 Xbox Live games by mid next year.

Another add-on; the Music Mixer, will be available as a \$40 (Rs 1,900) package later this year. This will allow

players to transfer music and images from their PCs to their Xbox consoles. The software supports 2D and 3D visualisations, and lets you make playlists and sing along to your favourite tunes, with lyric-stripping technology.



XSN Sports is a line up of sports games that let you form your own leagues and maintain stats on www.xsnsports.com, making it a more comprehensive experience.

Meanwhile, a new book titled "*Hacking the Xbox: an Introduction to Reverse Engineering*", is being sold by the author Andrew 'Bunnie' Huang, on his Web site. According to Huang, the book is so controversial that the publishers are afraid to publish it. So he's taken it upon himself to publish it in its entirety. The Web site says "Hacking the Xbox looks forward and discusses the impact of today's legal challenges on legitimate reverse engineering activities."

Mobiles threaten planes

Standard cell phone use can cause serious threats to planes by creating interference with the aircraft's navigation system, according to a recent research done by The Civil Aviation Authority, at UK. Mobile phones cause the plane compasses to freeze or overshoot and navigation bearings to be inaccurate.

A poster on the Professional Pilots' Rumour Network—a popular online community for airline pilots and crew, says,

"Occasionally during the taxi out, we overhear the characteristic chirping of a mobile phone through our headsets. More often than not, it turns out to be a crew phone; we switch it off, and then continue with no ill effects. Sometimes, however, it becomes necessary to hold clear of the runway and make an announcement reminding passengers to switch their phones off."



heroes

Apple's new iPod Apple has launched a redesigned iPod in 15 and 30 GB versions. The redesign improves on the earlier beauty making it even smaller than its predecessor and lighter. It now sports four backlit buttons between the wheel and the display.

Mobile gaming With its dominance in the gaming console market well established with the PS2, Sony now plans to launch the PlayStation Portable (PSP). This will take on Nintendo's GameBoy Advance, which has enjoyed a virtual monopoly. The new PSP will also play music and video. Sony wants to make it "the walkman of the 21st century". Nokia also plans to enter this market with its N-Gage gaming phone.

zeroes

SCO Group The SCO Group has sent legal notice to 1,500 of the world's largest corporations claiming they may be liable for the use of Linux since they claim it is "an unauthorized derivative of UNIX" to which SCO holds the rights". According to SCO, since Linux distributors do not warrant the 'legal integrity' of the Linux code, the user may be liable for its development and use.

Spyware and Adware Studies show 493 types of spyware lurking on 1,317 Web sites, up from 56 types on 125 Web sites a year ago. Adware with KaZaA and other such applications tracks browsing habits and reports them to advertisers. Visit www.spywareinfo.com or www.doxdesk.com for help online.

Present success, future tense?

Apple Computer's digital music service, iTunes Music Store sold 2,75,000 music tracks in the first 18 hours. The songs, including videos from Eminem, Bob Dylan, Sting and others, can be previewed for free as 30 second samples. All numbers can be copied to a CD and are automatically synched to an Apple iPod.



According to Billboard magazine, the retailer gets around 36.7 per cent of the price of a normal music CD. Forbes magazine says that Apple takes on 35 per cent for each track it sells.

Apple plans to make iTunes compatible with PCs by the end of the year with its upcoming Win-

dows version of Music Store.

iTunes 4 has a Music Sharing feature that allows people to share music over the LAN. The music is not downloaded permanently but it can be heard as streaming audio. Many programmers have found a way to extend this feature from LAN to the Internet. They have developed software that allows people to search Net-connected Mac's in order to listen to songs online.

New, improved pop-up ads!

Brian Shuster, a long time figure in the Internet pornography world, has recently received the patent for an advertisement format. Shuster's patent—the Traffic Management Utility—claims that pop-up ads account for 20 per cent of the revenue of the two most profitable Internet segments, online casinos and adult entertainment. He has set up Ideaflow Inc., an intellectual property holding firm, to license revenue from sites that use pop-ups and other advertising technology.

Other Shuster patents include similar technology to

take control of a user's computer and send them to unexpected Web sites. One, called 'Method, apparatus and system for directing access,' describes the use of hidden frames to inject Java script onto an user's computer that can be later used to send the browser to another Web site. This technology changes the system's settings and registry, sending the user continuously to a specific site—a porn

site—in Shuster's case. For example, typing in www.hotmail.com instead of <http://www.hotmail.com> will deliver a pop-up porn window, and then send the browser to Hotmail.



Online advertising software vendor, Unicast, is coming up with a 15 second, 300 K online advertisement that fills the entire PC screen.

This ad opens when a user clicks a link to go to another page on the same Web site.

quoteworthy

"The Tablet PC is just a buzzword, nobody is buying it. Market *nahi hai*."

Hirji Patel, Chairman of Allied Computer Industries explains that the Tablet PC is currently a niche product

"We have started to block access to immoral sites, as well as political sites which rudely make fun of religious and political figures in the country."

Iranian deputy post and telecommunications minister Masoud Davari-Nejad. The Iranian government has ordered Internet service providers to block around 15,000 Web sites

"We omitted panels for notebook PCs from this exhibition... they do not yield profit."

A spokesman for Samsung Electronics at the Electronic Display Forum in Tokyo, earlier this month.

tomorrow's technology

Nano a Mano

IBM has built the world's first array of carbon nanotube transistors. These tiny carbon atomic cylinders measure about 10 atoms across, are 500 times smaller than today's transistors and said to be 1,000 times stronger than steel. These findings will help in the making of smaller and hence faster chips. Carbon nan-

otubes may provide an alternative at the time when the physical limits of silicon technology will be reached.

Only semiconducting carbon nanotubes can be used to make transistors—the key component in electrical components and chips. Earlier manufacturing processes caused the semiconducting carbon nanotubes to stick

together in a rope like structure and get overpowered by the metallic nanotubes. This required each tube to be moved and separated individually. The IBM team were able to overcome this using constructive destruction, where only semiconducting nanotubes are produced with the electrical properties useful for making transistors.

snapshot

For the quarter ended **March 1**, online auction site, eBay earned **\$104.2 million**, more than double the **\$47.6 million** it earned last year

Source: Associated Press

■ Microsoft plans to turn MSN's free content services into fee-based subscription services ■ MIT professor comes up with a technique to harness energy from vibration

First post!

Hi Sumod,
What is stopping you guys from starting a Digit forum? You already have one where members can discuss obtaining back issues of Digit. Why don't you extend it such that, people like us, can talk about products to buy and have other technology related discussions? It will be a good place to share views especially since there is no such Indian technology forum. Do give this a serious consideration.

Bye,

Ajay

Via e-mail

Hi,

I am an avid reader of Digit and have never missed a copy of the magazine since May of 1998. I think Digit should start a forum where all the readers can meet and share their views and knowledge. Though there are lakhs of forums world-wide, very few are India-centric. You have been saying that you get thousands of mails for the Q&A section, and it is not possible for you to answer all; the forum could be an answer to this also. There could be sections such as Hardware talk, Software talk, Troubleshooting, Internet services/ISPs, etc And with the fan following Digit has, there is no doubt that it is going to be a huge hit. If you have any doubts, conduct a poll and you won't find a single Digit reader saying who won't agree. And yes, it is going to be the biggest online community in India as it is going to be from Team Digit!

Dr. G. S. Paul, Ludiana

Via e-mail

Dear Ajay and Paul,

We have plans for a forum on the Web site that would help our readers connect with and help each other regarding various technology issues. However, we are working on the goals for such a forum. All too often, such forums, started with great fanfare, languish for lack of a purpose. We would like to hear your opinions about the subject through this month's Reader Poll.

digit

Gender protection fault?

Hi,

In the Digit Diary of May 2003, you have a picture of the sixteen candidates that were selected in the Talent Hunt conducted by JDM.

I noticed that not a single woman was selected. Statistics shows that women are far ahead than men, academically. It is extremely hard to believe your results, any explanations?

Sunita

Via e-mail

Dear Sunita,
We would love to have a look at those statistics because frankly, we are just as amazed that we didn't get adequate representation of women in our applicants to begin with. Trust us: it is not something we would deliberately engineer.

digit

An offer you can't refuse

Dear Sir,

The writing of this letter is the consequence of receiving the Digit, May 2003 issue, containing the mind blowing offer for new subscribers. It really is a fabulous offer and I congratulate the entire Digit team for this great effort. Everyone will agree that the collection of such a comprehensive, 10-CD collection of software is an asset for those eager to upgrade or to keep their computer updated.



Frankly speaking, I am shocked, jealous and highly frustrated. Having recently renewed my subscription, I have missed the opportunity to grab this offer. Do not you think that the offer is an injustice for the existing subscriber?

I believe there will be many subscribers eager to get such a package and it will be highly appreciated if you would please offer it to us at an affordable price.

Thanks and warm regards,

Sudip Ghosh

Via e-mail

Hello,

After going through the May issue of Digit, I felt just a little bit jealous of the new subscribers—they will be getting 10 CDs free, with all the latest software, while I got only two when I renewed my subscription!

Just a suggestion: why don't you offer this pack to your old subscribers at a cost?

Aba Saheb

Via e-mail

digit

Dear Sudip and Aba,

There is always something bigger and better on offer the next day. To computer owners, it is a familiar feeling: buy the latest and greatest this month and watch it become yesterday's equipment, the next.

The 10-CD pack is only available to readers who either renew or subscribe after the offer commenced. There are no plans for offering the 10-CD pack as a stand-alone product. If you are already a subscriber, a renewal will extend your current subscription for the corresponding number of months and entitle you to receive the free gift.

digit READERPOLLS

Your vote counts

Q. What would you like to see on the Mindware CD?

Business Software	Utilities	Whitepapers / E-Books
12 %	72 %	15.8 %

Though Mindware is already chockfull of utilities, here is to more of the same

This month's question:

Question: What kind of forum would you like to use on the Digit Web site?

- ☐ Trouble shooting and advice ☐ Buying discussions
☐ Magazine feedback ☐ All of the above

Log on to www.thinkdigit.com and vote

Need more pages

Dear Sumod,

I have been a regular reader of your magazine for two years. I have found that the pages in Digit are in fact less in number than they used to be. In 2001, when you guys celebrated your anniversary, the magazine had 320 pages. All the issues in that year had at least 200 pages.

But now there are only 122 pages. I would suggest to you to include more topics, and carry at least two articles on Linux every month, so that people will find Linux a worthy OS and a cost effective alternative to Windows and Mac. This method could be used to increase the number of pages.

There is no point in including anti-virus updates in the Digit CDs. By the time the maga-

zine reaches the hands of the readers, the virus signatures get outdated by a week or so. Instead you can include plug-ins for Winamp and Windows Media Player 7.1, as well as Windows Media Player 9. This would definitely save the expenses that occur due to prolonged Internet usage.

Subramaniam

Via e-mail



Sir,

That you are coming up with the annual issue next month is indeed great news. We are up to our necks with CDs; can you, for a change, give us more reviews and comparisons, instead?

Mukul

Via e-mail

Dear Subramaniam and Mukul, Did we say we have a surprise in store for you? You will find that our anniversary issue keeps you busy reading for far longer than before. We also have some new sections introduced this month that should keep you active with your computers a little longer.

As for substituting skins instead of virus updates, you must keep in mind the many readers who do not have an affordable Internet access. But that does not mean we cannot carry skins for Windows Media Player, which you should be able to find on CD from the next month onwards.

Adopt a penguin

Dear Sir,

I am regular reader of Digit Magazine and make my technology-related purchases on the basis of your reviews.

Although you stress avoiding the use of pirated software, you do not focus on Linux in your magazine. Linux is the best way to avoid using pirated software and the idea of Open Source Software is being accepted by more and more people everyday.

Please dedicate a few pages of your magazine towards Linux and also include at least some software for Linux. How about a separate magazine dedicated to Linux. Mr Jasubhai, are you listening?

Rohan Naravane

Via e-mail



Of specs and prices

In addition to the technical articles; Digit, is a good source of information on what is available in the market, for what price. For those of us who live far from a major city, Digit is often our only source of such info. However, the specs and prices given are sometimes incorrect, and can lead to the wrong buying decision. I hope you will continue to make serious efforts to eliminate such errors.

Zotin Kuma

Via e-mail

Dear Zotin,

The Goofs column shows no signs of going away, but we do make every effort to ensure accuracy of product details and configurations.

While we ensure that we get accurate prices, computer component prices vary considerably from region to region and can move up and down rather unpredictably. This makes it almost impossible to get the printed prices to match those at your local dealer. Please use our prices as indicators to the value of the product.

Short Bytes

Fame and Digit

Dear Sir,

I started reading Digit a few months back and now, I eagerly await a new issue. I would like to congratulate, and thank you for giving us great and useful knowledge about computers and now, even cell phones. Thanks to Digit, I have become a famous computer consultant at school and home.

Suyah Misra

Via e-mail

Hi,

In the April issue, 'Stuck in a moment' by Ahmed Shaikh and Badri Narayan: they quoted the price of a pirated game as between Rs 200 to Rs 500 in Mumbai. But living in a small city such as Berhampur, Orissa, I am able to buy the latest games for Rs 25 only. If any of you would like to buy any new game please inform me and I will definitely parcel you one.

Vikram

There you have it: high cost of living, high cost of law-breaking. Metros are a bane!

Goof Ups

■ In the May issue, we listed E-Monitor as one of the products reviewed in the Bazaar section. The product will be carried in the upcoming July issue.

■ In your review of Nokia 8250 on page 47 in the May issue, you wrote that the phone features a FM radio and a picture editor. I found that the phone lacked both of the above mentioned features. I want to know if I was cheated by the vendor or it was one of your goof ups!

Abhinit Tiwari

We confess, it was a goof up!

Notice any goof-ups?

Write to goof@jasubhai.com

Send your letters marked 'Readers Letters' to the Digit office:

D-222/2, MIDC, TTC Industrial Estate, Om Sagar Building, Nerul, Navi Mumbai 400 706,

Phone: 022-7629191/9200 Fax: 022-7629224

E-mail: readersletters@jasubhai.com



VIPUL SHAH

// MTNL is probably the only corporate company in the world, which proudly advertises the fact that they make their customers wait in line for hours to make payments //

Telecom: David vs Goliath

A part from municipal water, which is the most essential and monopolistic service that we big city residents use day after day? The answer is basic telephony. It's reach and demand is growing. All homes, offices and shops in developed cities, towns and villages, have a phone. None of us would dare refuse a Diwali gift—read extortion money—when the telephone linemen come calling.

Customer service is virtually non-existent for basic telephony companies. Last year, while travelling by train, I saw an ad for MTNL's ECS service. The catch line for the ad was, "Why wait for hours in a queue to pay phone bills." This is probably the only corporate company in the world, which proudly advertises the fact that they make their customers wait in line for hours to make payments.

The entry of private players, such as Tata Indicom, Bharti etc has changed the industry. These companies have logical business plans, and try to provide the best possible customer support. But still, the situation in India, and most of the world, is one of 'duopoly', where two operators serve most cities. Although there is a significant rise in service levels, there isn't enough motivation for them to radically improve their approach and appeal. The knowledge, that customers don't really have a choice, only serves in pushing prices upwards.

Today, even middle class households receive bills in excess of Rs 1,000, only for local calls and dial-up Internet access. Over the past decade, the prices of CPUs, RAM, bandwidth and even international phone calls, have reduced. However, local call costs are still rising.

In the early 1990s, when Internet was just being accepted into homes, telephony companies didn't worry. Even when e-mail began to replace fax and international voice calls, SMS was replacing STD calls, and VoIP started becoming popular, companies such as AT&T, MCI or VSNL didn't worry. The problem was that you still needed these companies to make and receive local calls.

Today, in India and even the U.S, phone companies charge for every little feature or service. Services, such as Caller ID, Voice Mail, Call Waiting or Call Forwarding, all have charges and hefty taxes loaded on top of each other. It is common for an American household to receive a monthly phone bill of \$80.

A small, 70 employee, U.S start-up called Vonage DigitalVoice is emerging as a huge threat to the copper landline companies. Vonage does away with copper wiring to every customer home. Instead, it uses any existing broadband Internet connections you may already have—such as DSL, Cable or Ethernet. You get to choose between 70 city and area codes, even if you do not live there. For example, you could live in Atlanta, but have a New York city code. This way all calls to, and from New York are treated as local calls, and you can give the impression that you are based in New York.

The calls travel from Vonage DigitalVoice to subscribers over their broadband connection. Subscribers are provided with a Cisco ATA 186 analogue telephone adapter, that connects the Internet to a regular or cordless phone or even an EPABX. Vonage is offering free caller-ID, free call-forwarding to any number in the U.S or Canada, free voice mail that you can access from anywhere via the Web, and call waiting.

All these features cost \$25.99 per month, and include 500 minutes of outgoing calls anywhere in the U.S or Canada, as well as unlimited local calls. The international call charges are also cheap. It costs 5 cents per minute to call Hong Kong, 19 cents to New Delhi, 5 cents to London, etc.

Even while traveling, you can carry this ATA adapter with you and connect to a hotel's broadband connection, or to an Internet connection on flights. Here, you can make and receive calls at no extra roaming costs, while outside your city or even overseas.

This radical concept is sending shockwaves through phone companies in the U.S. Most high-value customers already have broadband Internet connections, and can save about \$40 per month per connection. In one year of operations, Vonage has got 20,000 subscribers and connected 15 million calls. Even when changing services, subscribers can keep their existing phone number, this has prompted many users to give up any second phone lines and replace it with a Vonage line.

Our Indian phone companies need to learn from this and start offering what they can, instead of sitting and waiting for some new technology to make them obsolete. ■

Vipul Shah is Chartered Accountant, and writes/consults on Internet, e-commerce, banking, finance technologies, he can be reached at vipuls@yahoo.com



Kiran Jonnalagadda

// Nobody
has yet
created a killer
application
that uses
Bluetooth to
do something
fantastic //

Living with Bluetooth

I jumped onto the Bluetooth bandwagon a few weeks ago. I had been hearing about it for months. Of how Bluetooth removes the clutter of cables from your desktop; of how your computer, mobile phone and PDA can wirelessly synchronize with each other; of how a range of Bluetooth devices around your house, all using their low-power short-range communications abilities, would make the smart home a reality.

And yet, all of this was just potential, still untapped. Nobody has yet created a killer application that uses Bluetooth to do something fantastic that couldn't be done before. The best I came across was the ability to send and receive SMS messages from your desktop, and at over Rs 15,000 for a decent Bluetooth capable phone, that ability was totally not worth the price.

And then one likely candidate appeared. Salling Software's Sony Ericsson Clicker (SEC) for Mac OS X lets you program a menu on to your phone that executes scripts to control applications on your desktop. Use it to switch tracks on your media player, navigate through slides on your presentation, control your mouse and do just about anything that you can write a script for. I use an Apple PowerBook running Mac OS X. All I needed was a USB Bluetooth adapter from D-Link and a Sony Ericsson phone (other phones do not have programmable menu abilities of the SE phones). D-Link doesn't sell their USB Bluetooth adapter in India, but Nokia sells a Bluetooth kit for their 6210i phone which includes a PCMCIA Bluetooth adapter. But a quick Google search revealed that it didn't come with drivers for Mac OS X and third-party drivers cost more than I was willing to pay. So D-Link, it had to be, and I asked a friend visiting California to pick up one for me from the Apple store.

A week after he returned with my adapter, I got myself a Sony Ericsson T68i. Unlike IrDA, Bluetooth is omni-directional. You can't just point two phones at each other and beam your address card because the phone across the hall will also receive the transmission. Bluetooth therefore requires that devices authenticate with each other first, which I did. I can now point at a phone number in my address book and tell the phone to dial. When

an SMS arrives, I don't have to rummage around for the phone because the message is already showing on my screen, from where I can either save it, or send a reply. I can synchronize my address book and calendar with the phone so I don't have to maintain each separately. Using SEC's proximity sensor, I can have my computer stop playing music when I walk out of the room and start again when I return. When I make a presentation, I have the freedom to walk around and still switch slides without having to return to the laptop, and without needing a minion assigned to spacebar-duty.

A friend of mine who visited California happened to meet Steve "Woz" Wozniak of Apple fame there, and described to me how Woz uses Bluetooth. American cellular service company, Cingular, offers a scheme where you can get up to four phones in a family pack, and all communication between these four phones is free. Woz has two phones on this scheme. One sits at home connected to a DSL line, the other sits in his pocket with Bluetooth enabled. When Woz wants to get online, he uses his laptop to make a data connection over Bluetooth to the phone in his pocket, which in turn makes a data call to his phone back home, which is connected to a DSL line. Woz can get online from anywhere in the US without a phone line or a network connection, for free. To hell with all the hype about WiFi!

So if there are funky things that can be done with Bluetooth, why isn't everyone using it yet? Let's look at Woz's case again—Something like that isn't possible in India. Sure, Indian cellular providers have schemes for free calls between phones, but that doesn't include free data calls. If you want data at a reasonable speed, it'll cost you an arm and a leg, and Bluetooth is really all about data.

As it stands today, Bluetooth does little more than eliminate cables at a very high price. If you really want the benefits of the technology, you'll only get it with large scale adoption, and therein lies the dilemma. Unless prices drop significantly, technology users will not adopt it. And unless there is demand, prices will not drop. If a killer application appears, it could remedy the situation by making people more willing to pay, but no one has figured one out yet. ■

Kiran Jonnalagadda is a technology enthusiast, and believes in the open source philosophy. Currently working with Pandey Labs, USA, he can be reached at jace@pobox.com



Talk to me...

and get a meaningful response! Meet computer systems with near human understanding

“**H**i Honey, I’m home. Get me some black coffee, read out today’s headlines and, uh, just pour Garfield some milk, OK?” says Jon. No, he’s not talking to his subservient significant other. This is the future, and he’s talking to his Natural Language Understanding Enabled computer-bot named ‘Honey’.

But that is the future. Right now, Honey doesn’t exist, and your computer doesn’t understand you. The complexity of human speech and writing, and the speed at which it changes to include slang makes it difficult for a computer to understand it. To get an idea about the complexities in human language, look at these two sentences, as commands spoken to a robot.

1. “Get me some water, I’m thirsty.

While you’re about it, yeah, like, get some for Jon, too.”

2. “Procure that quantity of water that is typically consumed by a human being when he or she is thirsty. Then place that water in an appropriate container. Immediately after that, procure a similar quantity of water and place it in a different, appropriate container. Give me the first container, and give Jon the second container.”

If we all spoke and wrote in the manner of the second sentence, Natural Language Processing (NLP) might not be so hard. But we do not, cannot and will not, speak this way, right?

In the first sentence, ‘get’ is ambiguous—does it mean ‘receive’ or ‘bring’? Similarly, how much exactly is ‘some’ water? A human being would not respond to this

request by bringing, say, a bucketful of water. But it’s not so easy for the robot to figure out what ‘some’ means. ‘While you’re about it’ is an expression that needs to be programmed into the robot, because the ‘it’ is obvious only to humans. Finally, when you say “get some for Jon”, it is not obvious to the robot that you want it to get ‘some water’ for Jon too.

In Dragon Naturally Speaking, a popular NLP software, what you say to the computer gets typed out in a program, say, Microsoft Word. Sounds neat doesn’t it? But those of you who have used it know that there’s a lot to be fixed. And speech recognition is only the tip of the NLP or Natural Language Understanding (NLU) iceberg.

Speech recognition is certainly one of the most important applications of NLP,

but there are many others. As a matter of fact, an ideal NLU system would put millions of people out of work. So why is NLP so big, why is it difficult, what's being done out there and what an ideal NLU can do for us, is what this story is about.

Eliza revisited

Eliza is a primitive NLU program written in the 1960's that emulates the way a psychiatrist speaks. Eliza recognizes simple sentence structures such as subjects and predicates, basic words such as I, go, tell, etc., and a few special words such as family and mother. If you were to type in 'I love my mother', Eliza may reply with, "Who else in your family do you love?" Sounds pretty intelligent, doesn't it? But when you say something it doesn't understand, Eliza just says, "Please go on", or something similar.

Eliza is a good attempt at NLP, but you'll realize its primitiveness when you type in something like, 'My father wins the chad mouse with Greek demons and no chicken soup for Fido'. In this case, Eliza would reply with something like, "Tell me more about your father", because of the word 'father' in that sentence. The problem is, Eliza doesn't understand most of what you're saying.

An ideal NLP, as far as possible, would store information and perform actions that you would expect of a machine that could understand what you are saying given your peculiar speech pattern. Some progress has been made along the direction of getting a machine to understand human language, but we are still very far from where we would like to be.

Why NLP is big

Why is so much serious work being done out there on NLP? What can ideal NLU systems do for us? Think of the possibilities that these systems would open up. They could read newspaper headlines out

IBM's MASTOR

IBM is developing a tool called MASTOR (Multilingual Automatic Speech-to-Speech Translator), which will enable conversation between two people who do not speak a common language. The first speaker speaks into a PDA or laptop, and the other person can hear the translation, spoken out by the PDA, in his or her language.

loud for you, and then give you a little printout of exactly what you are interested in. You'd have to hardly read anything!

And if you are one of those who wade through thousands of lines of technical journals and papers just to gather a few titbits of information, NLU systems could improve your life manifold. They could provide you with a weekly digest, and store information in a continually expanding database. With all the time saved, you would be able to take weekly vacations to Goa!

Need to read a text in Italian? Translate it using Google's patented technology, of course. And how does Google do it? It's not as simple as translating word for word; the system must, to an extent, understand the source text. Unless it understands the context, it translates poorly. For example 'mein Arm' (German for 'my arm'), is translated by Google into 'my lever', as 'Arm' in German can mean both arm and lever.

And wouldn't it be wonderful if you could ask a database to "find me all of Jon's records for the past year, except for the ones in March. Also, no personal information; just the official stuff". Now that would require your machine to understand what you're saying, and is definitely more complex than speech recognition.

Speech recognition has a range of applications beyond being able to tell your computer what to do. Some of them include automated customer service over the phone, training systems—where a computer is the instructor, in say, a distance learning program. In speech, recognition is one aspect, but generation is quite another.

Systems that read out text for visually impaired persons, such as JAWS, can be augmented so that the voice is infused with some emotion, and doesn't sound machine-like. This cannot be done unless



The Best Way to Personalise your desktop

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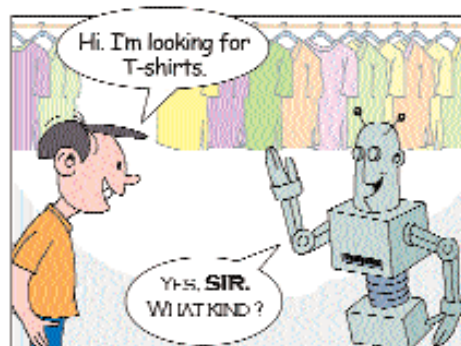


Thought Treasure

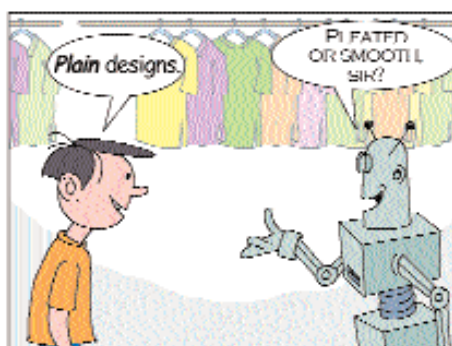
Thought Treasure is a powerful, natural-language processor that can interpret natural-language queries, respond to queries in natural language and identify emotions in the conversation. It has an extensible knowledge base. Applications of Thought Treasure include question answering, common sense-enabled agents and story understanding. Check out <http://www.sig-niform.com/tt/htm/tt.htm> for more details.

Bot with an understanding

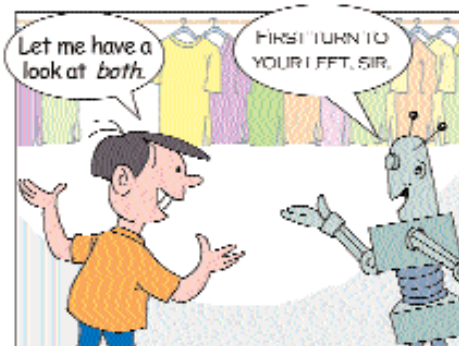
An advanced NLU could eliminate the need for everybody in a clothes shop, except perhaps the guy at the counter. Here's a typical scene at a regular clothes shop, only, it has NLU-capable bots. Notice the words in *italics> and what they could have meant.*



The bot figured the person's gender



'No-frills designs', not 'T-shirts with aeroplanes on them'



'Both' meant both kinds of shirts

the computer, to some extent, understands the text it is speaking.

Why NLP is hard

NLP is probably the best example of what AI is all about. But there are quite a few hiccups on the road to building the perfect NLUs.

Suppose one was to say, "Garfield's sitting back in his chair and relaxing". You would definitely understand it to mean that Garfield's relaxation is, at least partly, a result of his sitting in his chair. But a naïve NLU system would take it to mean that Garfield is doing two activities—(a) sitting on his chair, and (b) relaxing; the NLU doesn't co-relate the two individual bits of information to comprehend the sentence in its entirety. An NLU system also needs to fill in appropriate pieces to an incomplete sentence such as, 'It's hot today.' A naïve NLU would wonder what is hot today, while an evolved one would naturally conclude that you mean the weather.

A smattering of common sense also goes a long way. The sentence, 'It's late and I want to go' tells you that I want to get out from the place I am in now. But, it's difficult to make a machine understand that I want to go 'out', without explicitly using that word.

While using slang, parts of speech are often used interchangeably. A noun is sometimes used as a verb, and vice-versa. So if you say, "House him somewhere", an NLU system might generate an error, saying that 'house' is a noun. A trivial solution to this problem would be, "just supply all this information to the program". But that amount of information is huge, and the task of using it correctly, humongous.

References to other words, is a classic example of what makes a NLP system's work hard. Suppose you say, "Garfield and Jon are funny. I like the way he gets disgusted when the cat pours mustard in his coffee." Now look at the 'he' and the 'his' in that second sentence. It's easy for

us to figure out that they refer to Jon, but for a machine, even if you tell it that Garfield is the name of the cat, it will not automatically know who the 'he' and 'his' pertain to.

The need for phonetic information is extremely essential in speech-recognition systems, since a word can be identified based only on how it sounds. There needs to be a knowledge base that links words and sounds. The problem is that, when words are spoken at a normal pace, the sound is not the same as when they are spoken as distinct words.

Often a word can mean different things, in different contexts. For example, if the setting is an infotech office party, then 'host' would probably mean a server, and not the person who is hosting the party.

The logic-and rule-based approach

There are a few fundamental approaches to NLP, including statistical approaches. Essentially, the three phases in bringing a textual sentence to the desired form are the syntactic (structure), semantic (meaning) and the final representation.

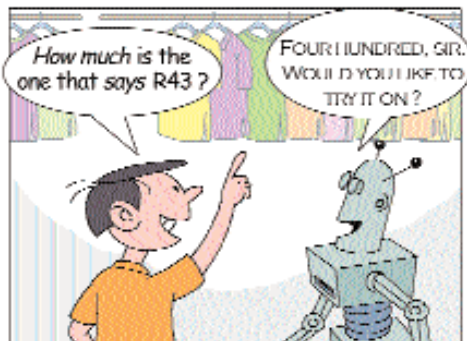
The syntactic phase takes care of the parsing of the sentence, i.e., the breaking down of the sentence into its component parts of speech such as nouns, verbs and adjectives. Parsing for NLP has a few significant differences from programming language parsing. Among them is the fact that there is no standard grammar to work with. Writing a grammar for a natural language is not easy. In processing natural language, part of speech organisation is essential, as opposed to word-by-word parsing

Research Groups in India

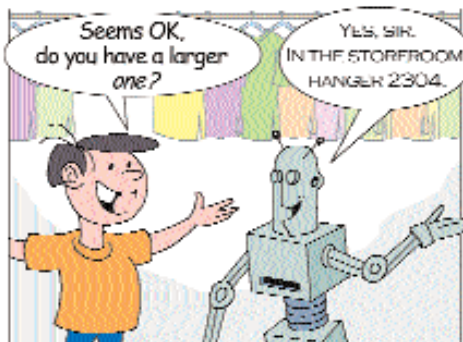
The NLP focus of the AU-KBC Research Centre of Anna University, Chennai, is Indian languages. The group works on building lexical resources such as dictionaries, a Tamil version of WordNet (an online lexical reference system) and tagged corpora (text that has been tagged in a desired manner). These are essential for researchers working on various areas of NLP. The group built the Tamil-Hindi Machine Aided Translation system, which has achieved accuracy in

the range of 75 per cent. They also have the Tamil Morphological Analyzer that can handle nearly 3.5 million word forms, including compound words, with accuracy as high as 95 per cent!

A group at IIT Kanpur is also working on projects such as Anglabharti—the Machine Aided Translation system from English to Indian Languages, as well as Speech-to-Speech Translation, Lexical Knowledge-Base Development, Transliteration and other linguistic projects.



'Price', not 'quantity'; and 'R43' was not said by someone



It realised 'size of T-shirt', not of something else

that can be done when parsing programs. Even the composition of a very simple sentence can be seen as a complex combination of noun phrases, verb phrases and so on. Determining these is not an easy task; issues such as the order of the phrases come into play. For example, a verb phrase such as 'killed the mouse' always follows, (and never precedes) a noun phrase, such as 'Garfield', hence—'Garfield killed the mouse.'

Once this is done, organising the components into semantic relationships would be the natural step, because from established knowledge, we know the roles of those components. This semantic representation can be in the First Order Predicate Calculus (FOPC). The FOPC allows one to make assertions in a formal way. If you had to say, "There are people who cross this bridge, but they do it only between 6:00 pm and 8:00 pm", this might be expressed in the FOPC as follows: $(P: (C)) \text{ AND } (C: (C = B))$, where means 'there exist', x means 'for all x ', P is 'people', C is 'crossing the bridge' and B is 'crossings between 6 and 8'. You can reason using the FOPC. Suppose you had

two assertions—'all cats are alive', and 'Garfield is a cat'. When you express these in the FOPC, you would have a semantic representation of those two facts, and you could automatically deduce that Garfield is alive.

In order to bridge the gap between the syntax and the semantics, we have to reason with the parsed sentences. The Lambda Calculus is one way of doing this. It allows one to express an idea with the actual details removed; say you want to talk about 'redness' without referring to a red object like an apple. You could say that $\lambda x.(\text{expression_containing_}x)$ means 'the role of the x in that expression'. With x standing for 'apple' and 'expression_containing x ' being 'a red apple', that entire Lambda expression would mean "redness." An expression in the Lambda Calculus can take one or more arguments, and results in a concrete expression that is the result of the idea applied to that concrete argument—so when that entire expression is applied to 'tables', it would result in 'red tables'.

But how do we reason with, for example, 'Jon likes Garfield'? We need a

The Loebner Prize

In the 1950's, Alan Turing made the famous statement that if a computer's responses to a human questioner left the human in doubt as to whether he were talking to a computer or a human, then the computer could be said to be thinking. That statement is extremely debatable, and debated too. Anyway, an award called the Loebner Prize seems to be built on Turing's state-

ment. It judges whether a computer's speech can fool a human listener into thinking it's a person speaking. The Grand Loebner Prize receiver is the machine that fools everyone that talks to it, and the annual prize is for the programmer of the most human machine each year. Visit <http://www.loebner.net/Prize/loebner-prize.html> to know more.



Microsoft Wheel Mouse Optical

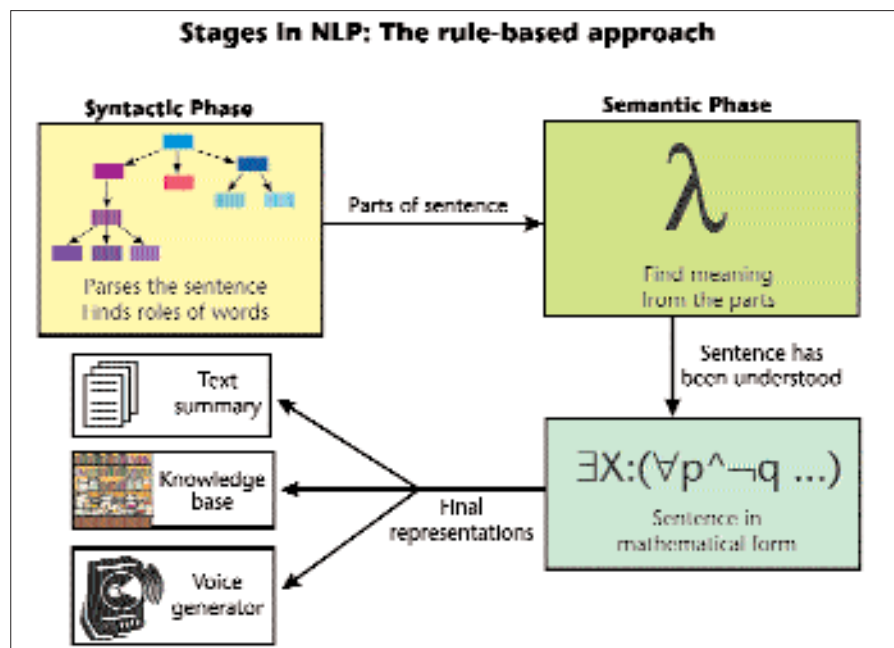


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way of expressing the verb phrase 'likes Garfield' as a predicate—which can then be used in the FOPC representation. Think of a predicate as an incomplete or tentative statement which, when applied to a particular subject, is either true or false. The way to do this could be $(\lambda x (x \text{ likes}(\text{Garfield})))$. This can take only one argument, namely, 'the x likes Garfield'. If the argument were 'Jon', it would mean 'Jon likes Garfield'. At this point, we have an intermediate representation.

We now need to structure the intermediate representation into a machine-meaningful and logical form. At this point, one might say that the sentence has been, in a sense, understood. The logical form used could be the FOPC. For example, 'Garfield hates all his mice', would be expressed thus:

$(\exists: M) \text{ AND } (M: \text{Garfield hates } M)$, where M is a set of mice that belong to Garfield.

The final representation is derived from the semantic representation, and is application specific, as the knowledge gathered usually has to be incorporated into some kind of database.

There are many other things to be taken care of, and the above is only a rough outline. For example, world-knowledge plays an important role, because if you want to understand something someone says, you need to know something about the world we live in. Several AI projects have had as their aim the construction of a common-sense

engine. A good example is the cyc project. For more details visit www.cyc.com.

The Perfect NLU system

Imagine that you work for a magazine and have perfected NLU systems all around your office. These NLUs would be able to understand each of the italicised words in the snippet given below:

You walk into the office building at 10 PM and speak to the voice recogniser:

"Open the gates, and if my friend doesn't get *here* within 3 minutes, close *them*. Oh wait, make *that* 10 minutes, OK?"

You walk in and tell your NLP personal assistant, "Get me all *back* issues that have the phrase 'natural language' in *them*. Oh wait, *forget* the January issue, I don't need *that one*." Your machine can do the correct search, and there you have your back issues.

Now you say, "We want to reprint the article which—*now wait*, which one was *that*... yeah, the *one* with references to Garfield. Just *take off* all the images and put *it* on the server."

Next you tell the e-mail server, "Hey, mail everyone *in Digit* tomorrow there's going to be a *reprint*, and tell *them* to do whatever's required."

Come to think of it, if we do get to the point where we can build the ideal NLP, why come into the office at all—you could just do it all over the phone. But hey, if the technology does get this far, how many of us would be needed at all?

RAM MOHAN RAO



◀◀ **Gateway Media Center PC
with Plasma Display**
Big and beautiful

Take an already cool WindowsXP Media Center PC, add a huge 42-inch plasma display, and you're on your way to entertainment nirvana. Watch TV, pause live programs, record your favourite shows, listen to music and burning your own DVDs—without budging from the couch.

It's all about the form

Here are a few things that technology did differently



◀◀ **NEC Powermate Eco**
Compute with a conscious

This simple looking NEC desktop features an all-in-one boxless design. It's been built with the environment in mind, and features a lead free motherboard and a boron free LCD. It also uses less power and generates less heat than traditional PCs.

Philips DesXcape 150DM ►► Detachable Monitor Convenience at home

The 15-inch Philips DesXcape is one of the youngsters from the new generation of smart displays. It's powered by Intel's XScale processor providing the performance needed to access PC applications and data from anywhere in the home using a wireless network. It has pen-based input, a wireless keyboard and stereo speakers to complete the experience.



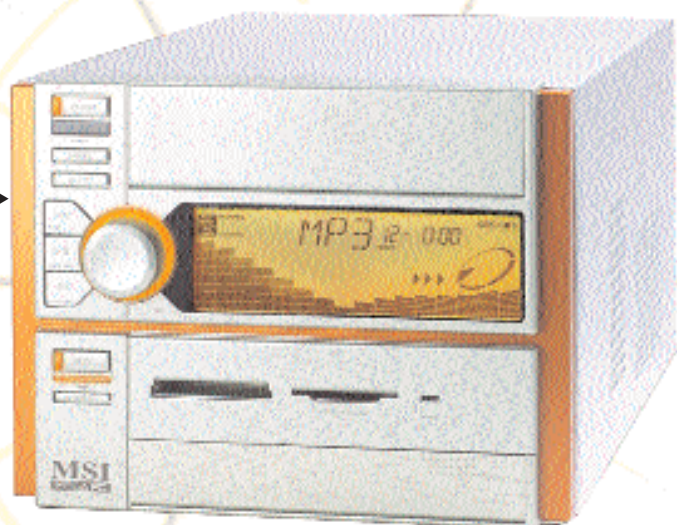
◄◄ Gateway Profile 4XL Where did the cabinet go?

The Profile 4XL is an instantly desirable desktop PC with a comfortable 17-inches of desktop real estate. And this looker is quite a performer too. It packs a 2.8 GHz Pentium 4, 512 MB RAM, 200 GB of space and a DVD-RW-cum-CD-RW drive. It saves space by skipping the external PC case—everything is squeezed into the back of the display!



MSI MegaPC ►► Boxful of entertainment

MSI's MegaPC is a pretty comprehensive entertainment system, not to mention a full-fledged Pentium 4 desktop. This toy box features a front panel LCD, an MP3 CD player, integrated six-channel audio, a remote controller, a TV tuner, FireWire and USB 2.0. It reads six types of memory cards and features handy front panel controls.



HARDWARE UNLIMITED



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Buying hardware is never easy. Your choice directly influences the performance of your PC, as well as the health of your wallet. Over a dozen expensive components go into the making of each computer, and you can choose from dozens of options for each of those components. Every month we bring you comparisons to help you make sense of the bewildering variety of hardware.

Compiled here is the distilled knowledge from all that testing—a complete reference to buying and making the most of every piece of hardware you could want. Turn over for market advice, maintenance guides and power tips to improve every part of your digital experience.

Buyer's Guide

CPU





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Like detergents, which become 'New & Improved' with every passing year, computers too keep getting revamped—with progressively fancier badging. The stuff in washing soap that warrants an upgrade (active oxygen, stain digestors, et al) may sound dubious, but there's no doubt what makes a computer meaner and faster—it's all in the enhancement to the CPU or Central Processing Unit.

The CPU may sound boring, but it's the component of a computer system people refer to most while describing the PC they have (such as a Pentium 4, a Celeron, or an AMD). The CPU can be called the brain of your computer. However, this brain requires a body and limbs to function effectively. Even if you have a fast processor, the rest of the components must be able to handle the output of that processor—or you'll be saddled with a system that crawls rather than zips. Keep this in mind when you decide on the right CPU.

There are a number of CPU manufacturers, including AMD, VIA, Motorola—and the grand-daddy of them all, Intel, which has the largest share of the consumer market. Intel's Pentium 4 CPUs are high-speed processors, ranging from 1.4 GHz to 3.06 GHz. However, the AMD line of CPUs—which include the economy-focused Duron and the high-performance Athlon—has become increasingly popular, as they cost less and offer comparable performance. AMD has also made great strides in the last 2 years in terms of a valid alternative to the Intel line of processors.

So which is the right CPU for you? Well, if you are buying a new one, and want the fastest computer available for graphics, games, and Internet applications, look no further than an Intel Pentium 4 3.06 GHz. This processor supports the latest performance-enhancing technology from Intel, called HyperThreading.

If you cannot afford a Pentium 4 processor, consider the AMD Athlon XP 3000+. If you wish to upgrade in the future, you might want to buy an Intel P4 2.0 or 2.53 GHz, which will give reasonable power for today's applications.

If you're running on a wafer-thin budget but still desire power, go in for the AMD Athlon 1.7 GHz.

Those who want to spend only the absolute minimum can go in for VIA-based processors, but please bear in mind that you may have to say goodbye to all your high-end games and resource-hungry applications.

Market Overview

The last year or so has been a dramatic one for the processor market. The race intensified even as the industry saw a massive jump in processing power from 2 GHz to 3 GHz. With vendors vying with each other to introduce higher speed processors, prices have taken a beating—and Intel and AMD have been pushing the P4 and the Athlon XP respectively.

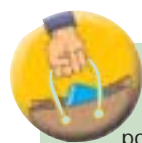
A scant 3 years ago, the Indian processor market did not compare favourably with what was available internationally. But now, it's on par with the western world, and any processor launched internationally is available in India right away. Entry-level processors from all three major players—Intel, AMD and VIA—are available for Rs 3,500 and up. Intel's entry-level workhorse, the Celeron 1.7 GHz, is still going strong with a price range of Rs 3,500 to Rs 3,800.

On the other hand, AMD's entry-level Athlon, the XP 1700+, has a price tag between Rs 3,800 and 4,000. But the majority of users in India still prefer Intel's P4 1.7 and 2.4 GHz, which come for Rs 8,000 to Rs 11,000. And although higher-speed CPUs (such as the P4 3.06 GHz) are available, the price tag is very high—around Rs 25,000 to Rs 28,000.

In the past, we've seen a major price cut from Intel, specifically in the P4 segment—the maximum price drop has happened in the 3.06 GHz, almost 32 per cent. In the next couple of months, this segment could once again observe a major drift in terms of technology and price, with both rivals Intel and AMD planning to shift to 64-bit architecture CPUs with their Itanium2 and Opteron respectively.

The thrust today from vendors as well as resellers is to provide a low-cost PC solution to the masses. VIA, the minnow in the pond, has taken a massive initiative and launched a motherboard that has an onboard processor with all the relevant peripherals. This has also helped AMD gain market share drastically, with market sources saying that in one year it's doubled its sales figure from 7.5 per cent to around 16 per cent.

This segment has been facing some unique problems, especially that of refurbished and repackaged CPUs being sold in the market. Refurbished or used CPUs from a certain area are bought back by resellers and system integrators and shipped to countries that lag behind in terms of technology. There's also a possibility that since a couple of CPUs come in tray packaging for volume sales, they cost less, and are hence bought and repackaged in boxes to get good price margins. Although this phenomenon may not be very prevalent, it does occur at times, especially at times when there is shortage, and you have to learn to be on guard.



Buying tips

■ Present-generation CPUs are power-hungry, so ensure that your power supply is rated at 350 W at the least.

■ While buying a CPU, either from Intel or AMD, make sure that you buy a genuine one. Genuineness can be confirmed by the hologram seal on the Intel CPU box. In the case of AMD, make sure that the plastic casing is not broken.

■ If you plan to do CPU-intensive tasks such as graphics processing, animation and gaming, opt for a CPU that has 256 KB or more of L2 cache. The Pentium 4 Northwood, for example, has 512 KB of L2 cache.

■ The new AMD processors sporting the Thoroughbred core name require less core voltage and have lower power dissipation, which makes them expensive. So if power requirement and heat dissipation are not an issue, you could opt for the more affordable Palomino cores.

■ Invest in a good heatsink and fan combination for your processor, even if you do not plan to overclock your system.

Speed of Thought

Cost and performance are the parameters that determine whether a processor fits into the 'budget' solution category or is an out and out 'performance' solution. The prices of mainstream 32-bit processors have fallen substantially and you can now buy an Athlon XP 2400+ GHz processor for about Rs 5000 giving you performance equivalent of a Pentium 4 2.2 GHz which retails at around Rs 9,500.

Technology Insight

The processor is a device that receives information from software, processes it in a predetermined fashion and returns the results.

This information is sent to a small storage region known as Level 1 cache. The data cache stores data, and the instruction cache stores the instructions in the program that is currently running.

The Arithmetic and Logic Unit (ALU) forms the core of the processor and performs the actual mathematical processing on the data such as addition and subtraction. There are two ALUs, on which handles intergers and another that handles decimals or floating-point numbers, such as 75.13. The Floating Point Unit is responsible for handling any mathematical operations involving decimal numbers. The Pentium 4 is generally better at calculating floating-point numbers, and thus more suited for graphics and gaming. The AMDs have decent FPU performance but are much more coste effective, so the y may be a good buy for running productivity applications.

The Branch Prediction Unit inspects the nature of the instructions in the instruction cache and decides which ofthe ALUs is best suited forprocessing the data fastest. This is done to ensure that no ALU is left idle. This streamlinesthe data transfer and thus increases the efficiency of the processor.

Decision Maker			
	General desktop use	Home entertainment	Gaming and graphics professionals
You need	Decent performance in office productivity Applications	Lag-free performance in all graphic, multimedia, and video oriented applications	Movies, music, gaming and complete home entertainment with oodles of processing power
Look for	Any Celeron/VIA class processor with speeds in excess of 1 GHz	A processor with speeds in excess of 900 MHz	An Athlon/Pentium 4 class processor with speeds in excess of 1.2 GHz
Our pick	Celeron 1.7 GHZ /AMD 1700+	Pentium 2.0 GHz or AMD 2400+	Pentium4 3.06 GHz or AMD XP 3000+
Price range	Up to Rs 5,000	Rs 8,000 to Rs 15,000	Rs 30,000 and above

1/2 pg H AD

Power Tips for Intel-based Systems



The right installation will pave the way for a trouble-free operation and let you harness the full potential of your PC. Keep in mind the following tips while buying and installing an Intel processor.

Keeping your cool: Since processors are continuously run at high speeds, cooling becomes an important issue—gift your processor a high rated heatsink combined with the best cooling fan.

Power to run: Due to additional power requirements, all Pentium 4 processors need the extra +12 V rail to run correctly. Therefore, make sure the power supply for your new processor has the necessary four-pin +12 V connector that goes into the ATX12V connector on your motherboard.

Go for quality: Don't pinch pennies and choose a cheap motherboard. A high-quality motherboard may cost a few thousand rupees more, but it will guarantee far greater stability and support for the hardware, the chipset and the BIOS. You'll also get more features, such as more overclocking options and integrated peripherals.

BIOS updates: Make sure you buy a motherboard that offers regular BIOS and driver updates on the company Web site. Regular BIOS updates means great support for newer hardware, and helps iron out any bugs and flaws. Newer BIOS updates can also mean significant performance boosts.

To HyperThread or not?: Intel's new 3.06 GHz processor now incorporates a technology called HyperThreading, which enables the processor to perform far better when running multiple applications simultaneously. However, this comes at a price, and you should opt for it only if you need high performance for executing multiple tasks. You will also need to confirm if your motherboard supports HyperThreading.

A question of memory: The current scenario gives users a choice of SDRAM, DDR and RDRAM memory in a Pentium 4-based system—DDR memory offers high data transfer bandwidth and is priced lower than RDRAM. However, RDRAM's higher data transfer rate makes it ideally suited to demanding applications such as gaming, CAD modelling and graphics-intensive, texture-heavy applications. Also, RDRAM needs to be installed in pairs, unlike DDR or SDRAM—this needs to be kept in mind while buying memory modules. These three types of memories cannot be used on the same system, so choose with care as you will not be able to change your memory type without changing the motherboard, if you need to do so in the future.

Willamette or Northwood?: While the newer Northwood Pentium 4 processors—built around the 0.13-micron fabrication process—are more popular than their older 0.18-micron Willamette counterparts, the latter is still available in the market. Willamette processors draw more power and therefore generate more heat. Also, Northwood processors integrate twice the amount of L2 cache (512 KB) as compared to 256 KB integrated by the Willamettes.

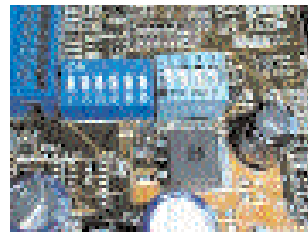
Special drivers: Intel supplies drivers for the new 800 series chipsets (including the 845, 845-DDR and 850 chipsets) called the Intel Application Accelerator driver. These increase the performance of your IDE devices significantly. They offer better boot times and also surpass the 137 GB limitation of the IDE drives in the native Windows drivers.

Application support for special instruction sets: Intel processors have always had special instruction sets such as SSE2 that help deliver better performance with certain types of data. You may need to install specific patches that let these applications use the special instruction sets.

Workshop: The right way to install a processor

STEP 1. Preparing the motherboard

Set your motherboard to run at the correct core voltage, bus frequency and clock multiplier setting by consulting the manual. In some cases, you may need to do this through the DIP switches on the motherboard or the Frequency/Voltage settings in the BIOS.



Step 2. Preparing the processor

Apply thermal paste on your processor by using a thin plastic visiting card—a plastic card is best suited to spreading the paste smoothly across the surface of the processor core. You can also extend this paste around the core, but smoothen out the paste so that there are no air bubbles. Also, the paste should be in contact with every portion of the processor core.



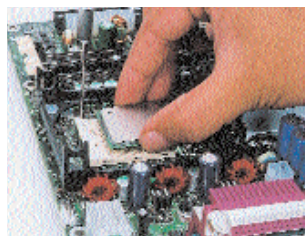
Step 3. Preparing the heatsink

Locate the region on the underside of the heatsink where the processor is going to touch the processor core. This is usually in the centre of the flat area of the heatsink. Once you have ascertained this zone, wipe it clean of any dust. Then evenly spread some thermal paste, carefully avoiding any air bubbles.



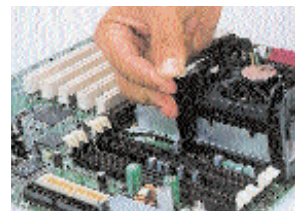
Step 4. Seat the processor in the socket

Clamp the processor firmly into the socket on the motherboard and see that it is correctly aligned with the pins. Do so without forcing the processor.



Step 5. Install the heatsink

Place the heatsink on the processor gently, but firmly—and take care not to damage the core of the processor while doing this. Make sure that the heatsink is seated such that it is in complete contact with the processor core. After it has been positioned, fasten the clasps into the retention hooks of the processor socket to ensure that it is in firm contact with the processor.



Step 6. Connect the CPU fan

Finally, connect the CPU fan on the correct point on the motherboard. Make sure that the heatsink assembly is firmly seated—there should be no play in it. You're now ready to zoom!



Power Tips for Athlon-based systems



Consider the following steps to build a reliable and high-performance AMD-based system:

Take care while mounting: Processors have a very delicate core as the silicon is exposed on top of the chip. Therefore, great care needs to be taken to ensure that the processor is not damaged by rough and incorrect installation of the heatsink. Ensure that the heatsink is installed flat down, do not try to slide it in, as this could render it useless.

Keep your cool: AMD processors are extremely susceptible to heat problems, and it is critical that they be kept cool. Therefore, the CPU fan has to be plugged in before powering on the system, otherwise the CPU and possibly the motherboard would be damaged within seconds of switching on the system. Also see that the CPU fan is correctly mounted on the system using thermal paste so as to maintain good contact between the heatsink and the processor.

Stick to ratings: Always use a CPU heatsink and fan combination that's been certified by AMD. If you prefer to buy a separate one, make sure it is rated and can run with your particular processor, as Athlon has stringent cooling requirements.

Power considerations: If you plan to use the faster Athlon processors (XP 2000+ and above) along with power-hungry peripherals such as a CD-Writer, large hard disks and a powerful graphics card, use a high-quality power supply with a rating of at least 300 Watts. Most low-end power supplies cannot deliver clean power to systems built on these components, resulting in an unstable system.

Follow the instructions: AMD processors also have specialised instruction sets like 3DNow!, which streamline the power of certain applications. To realise the full potential of these processors, make sure that your applications integrate support for the special instructions. In some cases, you might need to load special patches to enable the support.

Memory matters: AMD processors let you choose between SDRAM and DDR memory. While SDRAM is the cheaper of the two, DDR memory offers higher bandwidths and is continually evolving in terms of technology and speed. SDRAM is a good cost-effective option if you don't plan to run memory-intensive applications. However, DDR's inherent speed and falling prices make it a good investment for the future.

Which processor?: AMD gives you three choices in processors. While the Duron range offers reasonably good performance given its price, it makes sense to choose the Athlons, as Duron processors are on their way out. Here again, you get to choose between the older Palomino processors built around the 0.18-micron process and the new 0.13-micron Thoroughbred core. While the latter boasts higher clock speeds, lower power consumption and consequently better performance, not all motherboards support them. Ensure that your motherboard inherently supports these processors before buying them. Optionally, you could download a BIOS update that would enable the support, if your motherboard allows it.

Don't scrounge: A cheap motherboard will not only ruin your processor, but will also put the stability and reliability of your system at risk. Also, there are plenty of features that a good-quality motherboard allows you in the form of better hardware support, cutting-edge features, even support for overclocking. A branded motherboard will also feature BIOS and driver updates on its Web site.

Drive it in: Ensure that you download and run your AMD motherboard with the latest chipset drivers for high performance—and to eliminate any bugs or compatibility issues. Visit the chipset manufacturer's Web site frequently for driver updates.

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Also Remember...

- If you are on a very tight budget and only need basic office productivity, you should go for the low-cost Cyrix MIII processor from VIA. This works with any socket-370 motherboard.
- If you play a lot of games you need to look for a processor that supports special instruction sets like 3DNow! or SSE.
- For high-end 3D design and CAD applications, you will require a processor with the highest clock speed you can afford and the largest amount of cache on board. This would make the Pentium and Athlon processors your best choice.

The Future of CPUs



Microprocessors have been around for over three decades. It was in 1971 that Intel introduced the 4004, its very first processor—which ran at 108 KHz to power the Busicom calculator. This started a revolution by making the device intelligent enough to carry mathematical functions. This processor was packed with total of 134,000 transistors.

It would be ridiculous to compare any modern day processor to the pioneering but lowly 4004. Current processors, such as the Intel Pentium 4 3.06 GHz Prescott, support 800 MHz FSB. These processors are designed around a dual execution unit architecture, delivering the extra performance you might get from two CPUs in a single package.

The future promises lots of excitement in the processor arena. Irrespective of demand CPUs continue to get faster, hitting not only 4 GHz but also the next big jump to in speed to 10 GHz. Pat Gelsinger, CEO of Intel, recently said that Intel's engineers are adding 25 MHz every week and that this will come down to a day in a few years. While this is a tiny fraction of current clock speeds, its still an inexorable climb to more speed.

The 386SX processor in supported not more than 16 MB of memory, but the Itanium2 processor, which is waiting in the wings, will have as much as 6 MB of level 2 cache on it. The new processor will also consume lesser power. The lesser power requirement translates into lesser heat dissipation, which in turn means a longer life span. All this is made possible by developing new techniques that enable vendors to make smaller transistors that are so small that sub-atomic quantum effects become important; These techniques reduce width of wires that make up processor circuitry, lower current leakage by improving the fabrication process, and more.

As far as developing better performing processors goes, the common technique is to simply push for ever greater core clock and FSB speeds to get higher performance, while others approaches from companies such as IBM take the route of fabricating two processors on one chip to achieve the same goal of better performance. Workstation-level computing power continues its migration to desktops.

But as newer processors with newer architectures are released, the upgrade path becomes correspondingly more difficult than it used to

be. Newer processors will need mainboards that have chipsets specifically designed for them. A good example is the Intel 3.06 GHz processor, which supports 800 MHz FSB. This will not work at 800 MHz FSB on older boards, and clock down to 533 MHz. Hence one will have to buy a new mainboard to support the gigahertz monster.

64-bit Computing

After having tested the route to success by increasing the core clock of the process and FSB, what could be next on vendors' minds?

The answer: 64-bit architecture over the currently available 32-bit architecture.

Processors will soon embrace 64-bit architecture. The Opteron from AMD and the Itanium2 from

Intel are just two of the most-talked about 64-bit processors. These processors are currently available only for the server segment, but processors for the desktop should be available in a few years.

It will take some time for software vendors to come up will software optimised for these processors—a time-consuming task, but one that is inevitable. There are other vendors such as Sun, IBM and HP that are in the race to keep their customer base intact by offering 64-bit platforms of their own, or implementing Intel and AMD solutions in their architecture.

Embedded chips

The future will see embedded microprocessors grow unfettered. While embedded chips, which are inexpensive, are often treated as poor cousins, they still account for 98 per cent of total processors sold. Typically innovation developed for more expensive chips trickle down to embedded chips in a year or two. And some companies focus exclusively on developing embedded chips, which requires a special kind of hardware-software synergy.

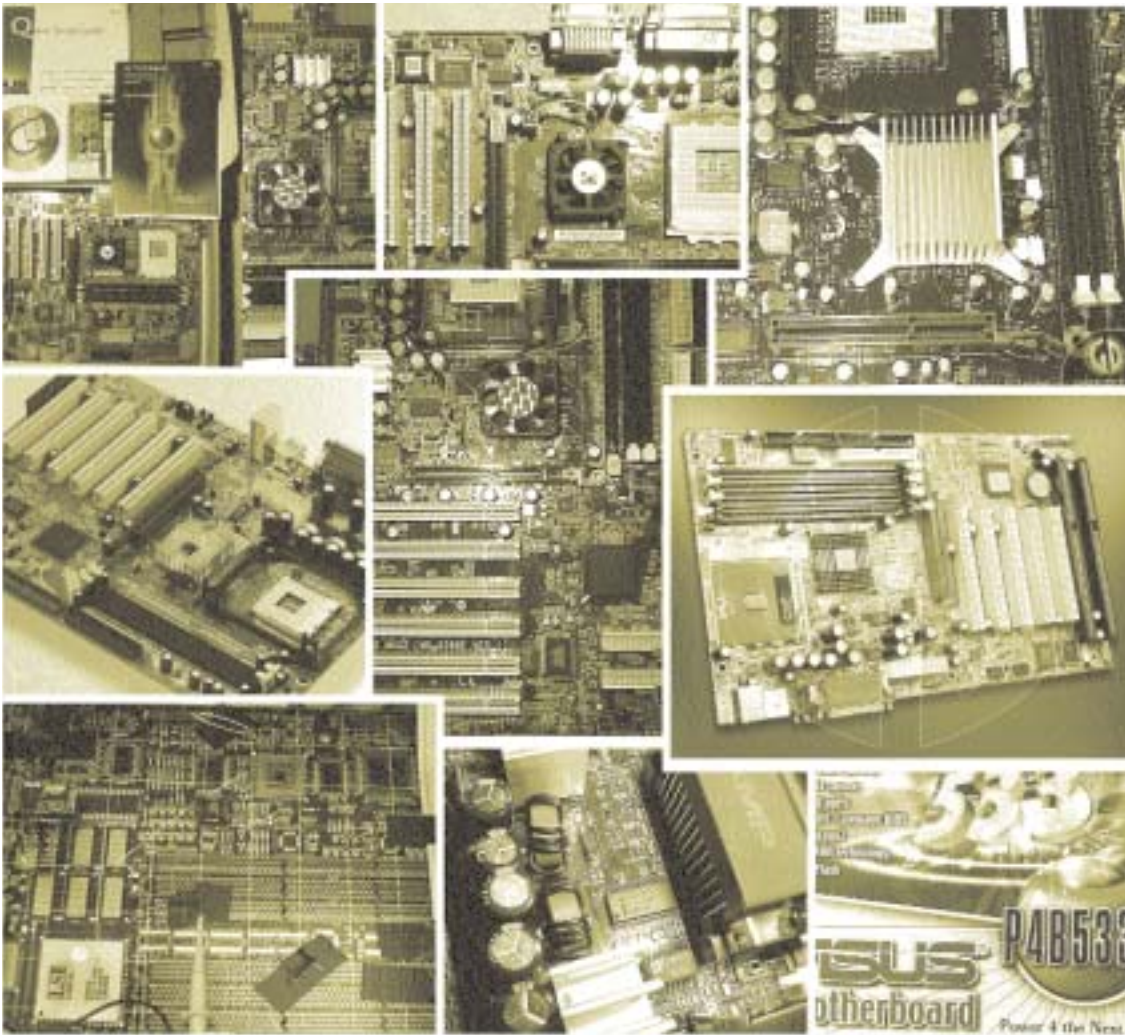
In the end...

There's a whole world existing outside the realm of Intel and AMD. Processors from these vendors are used more in the handheld and mobile consumer products because of their lower power consumption and affordable price. But since such vendors are positioned in a completely different segment, they have very little presence in desktop computing, but will definitely be making a place in our homes and offices soon.



Buyer's Guide

MOTHERBOARD





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The mother of all PC components—the motherboard—is the backbone of your PC. It's also called the mainboard (or 'mobo' for short), and holds the processor, memory and any add-on boards. It's located inside the cabinet and is the component all your peripherals plug into. If you open up the case, it's the thing that looks like a big circuit board—usually green, but it can be any colour.



Oddly enough, the motherboard seldom receives much attention. Early PCs had minimum integrated devices, generally ports for a keyboard and a cassette deck for storage. Everything else, including a display adapter and floppy or hard disk controllers, were add-on components that were connected via expansion slots.

Over time, more devices have been integrated into the motherboard. It's a slow trend though—I/O ports and disk controllers were often mounted on expansion cards as recently as 1995. Other components, such as graphics, networking, SCSI and sound, usually remain discrete.

Several manufacturers have experimented with various levels of integration, building in some or even all these components. However, there are drawbacks. It's hard to upgrade specifications if an integrated component can't

be removed, and highly integrated motherboards often require non-standard cabinets. Moreover, replacing a single faulty component may mean buying a new motherboard.

Consequently, those parts of the system whose specification changes fastest—such as RAM, CPU or graphics—tend to remain in sockets or slots for easy replacement. Similarly, parts that not all users need, such as networking or SCSI, are usually left out of the base specification to keep costs down.

In the late 1990s, the trend was towards putting peripherals designed as integrated chips directly on to the motherboard. Initially, this was confined to audio and graphic chips—obviating the need for separate sound or graphic cards—but in time the peripherals integrated in this way became more diverse, and included items such as SCSI, LAN and even RAID controllers. While there are cost benefits to this approach, the biggest downside is the restriction of future upgrade options.

A board with onboard features is more popular among branded PCs. If you buy a system from a big computer manufacturer, you're likely to get a fairly recent motherboard. You'll find that manufacturers often switch motherboards and other components without notice. They put in the latest technology they can find. However, if you buy your machine from a local dealer, you need to carefully select the right motherboard, as such dealers tend to give you a motherboard that's average at best—after all, they need to keep prices low.

While selecting a motherboard, check out specific sections such as USB ports—the more the merrier. If you have a digital video camera and want to connect it to your PC, make sure you ask about FireWire or USB 2 connectivity. Most motherboards do not come with FireWire ports, even today. FireWire add-on boards are pretty cheap nowadays, so you won't have to pay much extra. Digital video cameras today support USB 2.0, which is much faster than USB 1.x, and comparable to FireWire in speed.

If you're concerned about upgrading, find out how much memory and what type of memory your computer can handle. Ask how many PCI slots the motherboard has, and how many will be filled up when you buy your system.

If you buy a dinky little motherboard that can only take two DDR DIMMs, or have only two USB ports, and you end up needing three, you will be in trouble. So keep this in mind, just in case you need to upgrade suddenly to support new hardware or software. Ideally, you should buy a feature-rich motherboard that doesn't need upgrading often.

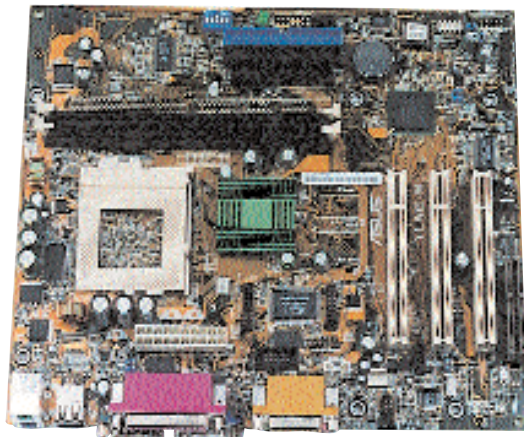
What is a chipset?

The word chipset is a term that is commonly used to refer to the core logic of a motherboard. The motherboard is built around a chipset that supports a specific class of processors and a specific type of memory. The main system chipset contains the logic circuits that contain a blueprint of how the processor, memory and other integrated components on the motherboard are meant to communicate. It acts as a hub, controlling the transfer of data between the processor, its cache, system buses and peripherals.

The timely transfer of data without errors is probably the most important function of a system chipset and its proficiency in performing this task dictates exactly how well the system as a whole performs. Apart from the main system chipset which handles the core components (and is commonly referred to as the North Bridge), most motherboards also have a separate South Bridge that integrates, manages and controls all the 'external' peripherals such as IDE, ISA, PCI, USB, etc.

A chipset defines the feature set and the performance of a motherboard—and, by extension, the entire system. The maximum speed of a processor that the chipset supports is important; for any further upgrades you'll need to change only the processor. For example, if a chipset supports up to 2.8 GHz CPUs, and you decide to buy a 2 GHz, you could upgrade to a 2.8 GHz CPU over a period of time without having to invest in a new motherboard.

The type of memory that a chipset supports is also important because there are three types of memory running at different speeds—SDRAM (the slowest type), DDR SDRAM (faster than SDRAM) and RDRAM (theoretically the fastest). The DDR variant is all set to become the new standard for memory as its prices are falling and RDRAM is being increasingly marginalised.



If you prefer the Intel platform, the Mercury KOB 845G-NDSmx would be the best buy due to its low price. If it's sheer performance you want, the MSI 845PE-Max2 would be the right choice.

On the AMD front, the MSI KT Ultra 400 would give you top-notch performance. On the value-for-money plank, the ASUS A7S266 offers reasonably good performance.

Market overview

With technological updates happening at a brisk pace, new and innovative features such as Serial ATA, USB 2.0 and RAID are needed to stay ahead of the competition.

AOpen has, for instance, added FM Radio on its motherboard, making it a complete entertainment machine. Another trend is the shrinking size—the latest entrant from VIA is almost half the size of its competitors, but offers comparable performance.

The major players in terms of volume are Mercury, Digi-Link, DFI, Krypton and HIS. Brands such as MSI and ASUS, which are priced slightly on the higher side, are preferred more by technology enthusiasts and users looking in for performance. Since P4 processors sell the most, P4-compliant

motherboards are more in demand. Motherboards supporting Celeron and PIII are also available in the market, but there are few takers. Entry-level boards for both AMD and Intel are available in the range of Rs 3,500 to Rs 3,800, and with processor prices falling in the future, even motherboards may see a plunge in prices to the tune of 5 to 8 per cent in the mid-range and premium segments.

With market demand also gaining momentum in smaller cities and towns, the focus is on low-cost PCs, and vendors offering real value for money are the ones who stand to gain. The demand for high-end motherboards, once concentrated in metros, has now moved to B and C class cities all over India.

Recently, some new brands have become available in small pockets of India. Prominent among these are Jetway, Proteam, Epox and AOpen. These new entrants are focusing on the value segment, with various chipsets. When talking about the most popular chipset, Intel's 845G supporting SDRAM memory is hot, followed by others such as 845E for DDR. SiS, with its 650 chipset, is the one of the front-runners in this transitional phase, supporting both SDRAM to DDR. With its low cost of around Rs 4,000, this is indeed a great buy.

Another important—and very recent—trend is that DDR memory is fast replacing SDRAM. In the near future, DDR RAM will become an entry-level feature, rendering SDRAM obsolete.



Buying Tips

■ To get the best deal, always poke around a few shops before you make the final decision. This will give you a fair idea of what's currently available in the market. The best way to buy the ideal board is to first read reviews and then look around for either the same board or its nearest variant in the market.

■ A motherboard may present itself in various guises. The MSI 845 MAX2, for example, is available in Pure, FIR and FISR variants. Pure is the base model, and the others have certain feature additions such as RAID and USB 2.0, but for minimal increments in price. Don't buy the costliest board if you think you will never use the additional features. Buying extra features means additional maintenance of drivers and ports.

■ If you're a hardcore gamer or a fan of overclocking, check that the space around the CPU is spacious enough for you to install a larger heatsink-fan combination to keep things cool. Go in for a board that allows overclocking of FSB in steps of 1 MHz, and allows core voltage adjustment.

■ While buying a motherboard, ensure that its chipset supports both, the speed of your processor and the speed of the Front Side Bus (FSB). This is very critical today, where

many boards available in the market might not support the clock speed of your processor. Even if it does, it may not support your CPU's fast FSB and underclock it, lowering the performance.

■ With your applications in mind, ensure that your motherboard is sufficiently feature-rich. In particular, make sure it has enough PCI and memory slots for future expansion.

■ If cost is not a hindrance, opt for a motherboard that has both an onboard video chipset and an AGP slot. This will give you greater flexibility while making future upgrades. Also check whether the AGP slot supports the latest 8X transfer rate. Many new cards now support AGP8X and future cards will run on this.

■ Ensure that your motherboard has an onboard sound chipset (and, if you so require, integrated Ethernet). Newer boards also support 5.2 channel Dolby Digital and Gigabit Ethernet, which have started showing up on some high-end boards targeted at desktop users.

■ While buying a motherboard, check whether the board supports the type of memory your system has—buyers of DDR-SDRAM should be especially careful in this regard.

Motherboard

The right base

The scenario in the motherboard market has radically changed over the past year or so. There are now choices for every single type of consumer need, beginning from 'plain jane' motherboards, to fully featured powerhouses, for every single type of mainstream processor. However, technology changes so quickly that yesterday's powerhouses become out-dated tomorrow. Owning the 'best there is', is a short lived pleasure. Thus, keeping up with the technology curve for motherboards could mean an investment of thousands of rupees each year.

There are ways to avoid this constant upheaval of hardware, and it begins by choosing the right technology and feature set. This alone can ensure that your PC is ready to tackle the next-generation of hardware.

Jargon busters

The primary function of a motherboard is to provide a base upon which other components, such as the processor and RAM, can reside. Since different types of components reside on the motherboard, it also has to be capable of co-ordinating the flow of information between these components. It also orchestrates the transfer of data and information within the system.

Smart tips

Processor interface: This is the socket on the motherboard that the processor is mounted on.

There are generally three types of slots available: Socket 370 (for Via), Socket A and Socket 478.

Chipset: Different chipsets are used to support functions that are offered by the board—the RAM and, more importantly, the processor. For example, the Intel 845 chipset supports Pentium 4 and DDR SDRAM. AMD processors (Duron and Athlon) require VIA KT 333 or 400 chipset-based motherboards.

Interface slots: These slots are used to connect add-on cards such as a soundcard or a network card, to the computer.

There are primarily two types of slots found on today's motherboards—PCI and AGP. PCI cards are the most commonly available, whereas the AGP interface is meant solely for high-speed graphics cards.

RAM slots: DDR RAM is the most popular option today, with SD RAM fading into oblivion. Most motherboards have at least two slots, but more expensive models have four slots for RAM. Remember that the total amount of RAM that you can install in your system is also dependant on your motherboard chipset.

BIOS: Every motherboard carries a special circuitry called the BIOS (Basic Input Output System), which exists on a Read Only Memory (ROM) chip. The 'jumperless' motherboards that are the norm today, allow all parameters to be automatically detected and configured. For example, the processor core voltage and clock multiplier, and the configuration and control of integrated peripherals are all auto-detected.

Also Remember...

■ Always check the maximum CPU speed supported.

■ Look for onboard USB ports, options for additional USB ports and also for Firewire ports.

■ Onboard thermal and fan speed monitoring are a must for servers and AMD users.

■ Voltage and Bus speed tweaking, for overclocking is an added advantage.

■ Buy an ATX or Micro power supply—the ATX power supply has better power management features.

■ The higher the number of IDE devices supported, the better.

■ Look for support for ATA-133 IDE, Serial ATA standards.

■ Check for the highest FSB (Front Side Bus) speed supported.

■ Support for ECC (Error Correction Capability) RAM is advisable.

■ Integrated features, such as onboard soundcard and display card (for SoHo users) will save you a pretty penny.

■ Look for additional features, such as Wake-on-Modem-ring (integrated into the BIOS)—it allows the computer to power on automatically for receiving faxes.

Decision Maker

	Bare necessities	Future resistant	Performance seeker
You need	Basic support for current processors and peripherals	Flexibility and upgradeability	Maximum performance and overclockability.
Look for	Minimum three PCI slots with integrated sound and video in the Micro-ATX format	Minimum five PCI slots, three RAM slots, an AGP 4x slot in the ATX format.	The latest chipset for your processor and options for easy over clocking
Our pick	Mercury KOB650GL NDSMx (Intel), ASUS A7S266 (AMD)	DFI NT72-SA (Intel), ASUS A7S266 (AMD)	MSI 845PE Max2 (Intel), MSI KT4 Ultra (AMD)
Price range	Rs 3,000 to Rs 5,000	Rs 5,000 to Rs 8,000	Rs 10,000 and above

Make sense of dealer-talk

ACPI: Advanced Configuration and Power Interface is a power management specification that allows the OS to control the power distributed to the computer's devices.

AGP: Accelerated Graphics Port is a PCI-based interface that was designed for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs at only 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

BIOS: Basic Input and Output System program resides in the ROM chip, and provides basic instructions for controlling the hardware. Both, the OS and application software, use BIOS routines to ensure compatibility.

Bus: This is a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses. Local buses are those that operate within a single system (as opposed to a network bus, which connects multiple systems).

Cache: This is a temporary, fast storage area that holds data from a slower storage device for quick access as needed by an application. Access time is fast using a cache, because the needed information is stored in the SRAM instead of in the slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512 KB, while you may have as much as 2 GB of regular memory.

Chipset or core logic: Two or more integrated circuits which

control the interfaces between the system processor, RAM, I/O devices and adapter cards.

CMOS: Complementary Metal-Oxide Semiconductors are chips that hold the basic start-up information for the BIOS.

Form factor: This is an industry term for the size, shape, power supply type and external connector type of the PCB (personal computer board) or motherboard. The standard form factors are the AT and ATX, although TYAN also makes some Baby-AT boards.

FSB (Front Side Bus): The FSB connects CPU to main memory (RAM) and is a critical component in determining the speed of your computer.

IDE: Integrated Device Electronics is a simple, self-contained hard drive interface, that is most commonly used in desktop systems.

ISA: The Industry Standard Architecture is a slower 8-bit or 16-bit Bus that is only used with very old hardware.

PCI: The Peripheral Component Interconnect is a 32-bit local bus, faster than ISA, and the current standard for add-ons such as network and sound cards.

RDRAM: Developed by Rambus, Inc, RDRAM is the fastest memory technology used. While the more common SDRAM delivers data at a maximum speed of 133 MHz, RDRAM currently transfers data at up to 1200 MHz.

UltraDMA/33/66/100: This is a fast version of the old DMA channel. UltraDMA is also called UltraATX. Without UltraDMA controller, your system cannot take advantage of the higher data transmission rates of the new UltraDMA/UltraATA HDDs.

Tips On Installing Motherboards

The motherboard is the physical and electronic foundation of your system. Here are a few tips that will help smoothen the installation process:

Get it set right

Before you install the motherboard, consult the accompanying manual. You may have installed motherboards numerous times, but manufacturers have addenda that describe special considerations or last-minute changes incorporated into the board. Also, mark all the jumper settings in the manual tables so that they correspond to your processor, RAM and other system components.

Handle with caution

The motherboard has very sensitive electronic components that are susceptible to damage by static charge. Therefore, ensure that you are properly grounded and that the motherboard is kept in its anti-static packaging until the time of installation.

Set the jumpers

Set the jumpers to their correct positions before installing the motherboard into the system cabinet. It's far easier to access certain jumpers when the board is outside the system.

Mount the processor, heatsink and RAM beforehand. It can be quite difficult to mount the processor after the board is seated in the cabinet; since the power and IDE cables get in the way. This also allows you to visually verify if the heatsink is properly seated on the processor. Remember to connect the CPU fan to the correct point on the motherboard.

Ensure a comfortable fit

The power conditioning capacitors next to the processor socket can

get in the way of mounting the CPU heatsink.

Make sure your heatsink does not push against these, as this could damage or dislodge them from the motherboard. Also, if you have a special heatsink, make sure it does not push against other surface-mounted components such as capacitors next to the processor socket.

Anchor the board

Make sure that your motherboard is comfortably seated in the cabinet. Ideally your cabinet should have a detachable backplate, which lets you mount the motherboard using the spacers and mounting screws outside the system. Ensure that the motherboard has anchor points near all the extremities of the board so that it's firmly seated and all edges are adequately supported.

Tighten later

Most of the time, one would tighten all the screws of the motherboard on placing it into the system. A better option is to lightly fasten all the mounting screws so that there's still a bit of play in the motherboard after it has been mounted. Tighten the motherboard mounting screws after the rest of the add-on cards have been placed in their respective PCI or AGP slots. This eliminates any unnecessary use of force to get cards into a slot.

Attach the IDE cables

The IDE cables are usually situated near one edge of the motherboard. Make sure the board is not bent when plugging in the ends of the cables. If you're not careful, this could cause breakages in the delicate tracks on the motherboard surface, rendering it useless.



Attach the CPU fan

This cannot be stressed enough. Ensure that the CPU fan is plugged into the correct point on the motherboard. Failing to do so could result in your CPU and motherboard being permanently damaged and all this could happen within seconds of powering up the system, leaving you with absolutely no time to realise your mistake!

Listen for diagnostic beeps

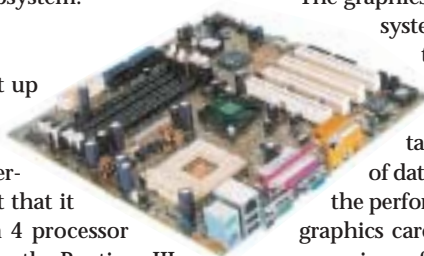
Remember to connect the motherboard speaker. Study the motherboard manual for deciphering the sequence of the diagnostic beeps that are emitted when the motherboard is powered up—a single short beep means things are in order. Otherwise, you need to diagnose what's wrong by listening to the beep sequence. Check if all fans are spinning, and that the cards and RAM modules are properly seated.

The ABC of Motherboards

The overall performance of a computer system is dependent on its ability to perform a collection of tasks optimally. It depends on various specialized subsystems to perform these different tasks—the processor subsystem, the disk subsystem, the memory subsystem and the graphics subsystem.

The processor subsystem

A motherboard is designed from chipset up to support a specific type or class of processor. The chipset it incorporates will therefore determine how the motherboard performs and the basic feature set that it offers. For instance, since the Pentium 4 processor works differently when compared to even the Pentium III, the motherboard design is varied to take advantage of the higher performance available. It needs to take advantage of the higher clock speeds at which the processors runs and also the higher (quad-pumped to 400 MHz) FSB frequency (Athlon XP requires 266 MHz of FSB). The ability to integrate a particular type of processor without compatibility issues and then to fully utilize its potential performance is the motherboards first and foremost goal.



Memory subsystem

The memory subsystem is probably the most critical subsystem because it needs to constantly feed the processor with data. To squeeze every last ounce of performance, the memory subsystem must have very tight memory timings and implementation. Despite the presence of strict memory standards, there will be slight variation in the memory modules produced by different manufacturers. The motherboard has to ensure that the memory—slots can handle these possible variations and at the same time maintain accurate and tight timing cycles to ensure error-free and high-speed data throughput.

Disk subsystem

Performance within this subsystem depends heavily on the chipsets implementation of an IDE controller. An under-performing IDE subsystem can cripple performance when it comes to video editing and other data-hungry, streaming media-based applications. Each time that these applications read or write data from or to the disk, instructions are passed to the drive's controller's device driver. The driver then pumps data through the PCI bus to the IDE controller. Improper implementation of this part of the entire subsystem can severely hamper the entire data transfer process. This happens when the PCI bus has not been isolated from noise from other devices on the motherboard which causes data corruption and lock ups due to large file transfers (this

happens when a large amount of data is suddenly pushed through the bus, which then collapses due the load).

Graphics subsystem

The graphics subsystem deals with the video performance of the system. This is the part that actually generates the images that you see on your display. The realism of computer games depends to a large extent on the total amount of bandwidth offered by AGP. More importantly, however, the graphics card needs continuous flow of data from both the processor and the memory. Although the performance of this subsystem is largely dependent on the graphics card installed, you will be amazed to find large differences in performance due to the use of different chipsets and the manner in which they are implemented in a motherboard.

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The Future of Motherboards



Motherboards now have Serial ATA support, Dolby Digital sound and RAID controllers onboard. Support for Dual Channel DDR, connectors for card readers, IR ports and onboard LED indicators for fault diagnostics are some other futuristic features that have not made much inroads into mainstream motherboards.

Chipset: New processors need newer chipsets to support them. Some of these are the 875P chipset from Intel, nForce2 from nVidia, UniChrome KM400 from VIA (for the AMD processor), SiS655 and SiS748-Dual channel DDR333 (for the P4), and DDR400 with support for AGP8X (for the AMD). These are, however, found only in high-end boards.

There are some very recent launches for the AMD family—nForce3 Pro 150, 250 and Intel has released the I875P (earlier known as Canterwood) and Springdale chipsets. nForce3 Pro is build specifically for single processor workstations. nVidia has bundled the latest goodies with nForce3 Pro's single chip design such as Serial ATA/ATA-133 with RAID.

nForce3 Pro is to be a single chip design, making the manufacturing and designing of boards easy for third-party manufacturers. It's built using 0.15 micron fabrication process, allowing room for more features. The single chip will most likely make over-heating less of a problem, and reduce latency between the motherboard sub-systems, which will translate to increased platform performance.

The I875P chipset will support DDR-400 memory and with quad-pumped 800 MHz FSB and the new HyperThreaded P4 processors. The Canterwood chipset has the tweaked 'turbo mode' PAT (Performance Acceleration Technology), named after CEO Pat Gelsinger. The Springdale chipset, on the other hand, will be available in three flavours—865G, 865P and 865PE.

The year 2004 might see the replacement of Canterwood and Springdale by the Grantsdale chipset. This will sport the cost-efficient LGA (Land Grid Array) 775 pin layout which will oust the current BGA (Ball Grid Array) and PGA (Pin Grid Array) pin layout. There's going to be extensive replacement of current generation chipsets across the board, and support for new technology as well. But all this is targeted mainly at the high-end segment, and will take some time to percolate to the majority of home users.

RAM Support: Intel still continues to offer support for RDRAM by releasing its last RDRAM chipset (the 850e), but there's zero support from other chip manufacturers. DDR memory is what's being pushed in a big way by major mainboard chipset manufacturers. Gigabyte has already released its board based on SiS655, supporting Dual Channel DDR memory. Memory supporting dual-channel DDR is pretty expensive at the moment, because of the limited availability. But as time passes, prices will fall to realistic levels. The older SDRAM memory is still around but will diminish soon.

Manufacturers such as IBM, Motorola and Infineon are

specifically involved in the research of a new form of solid-state memory called Magnetoresistive RAM (MRAM). This type of RAM uses the principle of alignment of magnetic particles as the basis of storing zeroes and ones in a digital system.

An inherent advantage with MRAM is that it since it's based on the principle of magnetism; it retains whatever information is contained in it even after power is switched off. Additionally, these elements do not need an electric charge to retain information, hence power consumption of these devices is minimal compared to that of DRAM. Finally, with the absence of the delays associated with transferring electricity between the storage elements for retaining the information, MRAM is expected to be up to 30 times faster than DRAM.

MRAM is thus poised to give rise to a new breed of instantly-on computing devices.

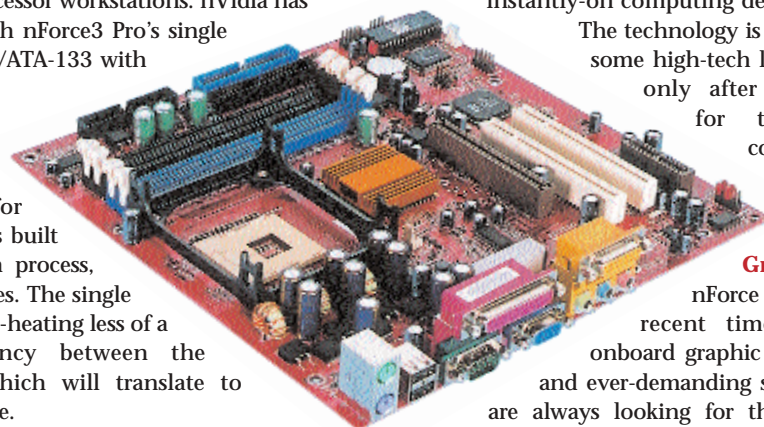
The technology is already up and running in some high-tech labs around the world. But only after the fabrication process for this memory becomes commercially viable will it make its way into mainstream home PCs and handhelds.

Graphics support: The nForce chipset was the first in recent times to deliver a decent onboard graphic solution. As newer games and ever-demanding software are released, users are always looking for that extra bit of graphical processing power. The AGP 8X graphics interface has already become the standard interface in most boards today.

Interfaces: Support for up to 10 USB 2.0 ports, IEEE 1394 (FireWire), card readers etc., are some features that will soon become standard with every motherboard. As users acquire more and more devices with PC connectivity—such as digital cameras and cell phones—it will become necessary to have such features on board. PCI-X, which has a 1 GB transfer rate, has a performance boost of at least 32 times over the current PCI standard. PCI-X standard is backward-compatible and therefore will support PCI cards as well.

DPS: DPS (dual power system) is a new technology that enhances the stability of the system. This technique allows the board to have a total of six phases for power circuitry—twice the number recommended in the standard motherboard design guideline. A 3-phase power circuit Dual Power Voltage Regulator Module (DPVRM) daughter card can be added on the board, to help provide more stable power circuits.

Design: Motherboards are likely to go both bigger and smaller. With additional features going into standard motherboards, it might get bigger rather than smaller. However, single chip designs and high level of integration will drive sizes down as well. Companies as ViA have come out with a complete platform known as IDEN, which has an onboard C3 processor running at 1 GHz, 5.1 channel sound and graphics. The board is right now targeted at basic office users and comes in a very small form factor.



Buyer's Guide

DISPLAYS



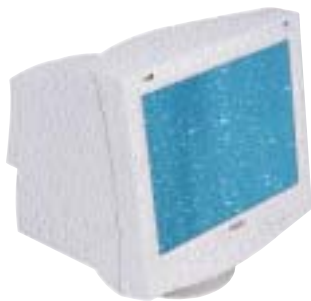
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Full page AD



It's hard for a monitor to remain inconspicuous. While other components shrink with each passing year, monitors appear to be getting bulkier—if you ignore the snazzy new LCD monitors, that is.

Yes, monitors are undoubtedly bulky; they hog a lot of power and take up a lot of desk space. However, the monitor is often a long term companion for any PC user, since it does not need to be updated very often—good ones remain trouble-free for years.

The monitor is also one of the more important things to consider while buying or assembling your computer. First of all, the display, which depends on the monitor and the graphics card, is one of the more expensive components that you would buy—it makes up roughly a quarter of the cost of your entire computer system!

Monitors available in the market today support 16.7 million colours and are capable of displaying a resolution of up to 1,600 x 1,200 pixels, at refresh rates as high as 85 Hz. And monitor sizes have now gone up to 22-inches. Due to mass production, large monitors have become affordable; a few years ago such huge monitors could be found only in laboratories.

There are mainly two technologies available in the CRT (cathode ray tube) monitor segment—Shadow Mask and Sony's Aperture Grille. Both technologies have their pros and cons, and both are doing well in the market. CRT monitors have quite a few disadvantages over the other alternative—LCDs.

CRT monitors are heavy and bulky, and power-hungry. Their high-voltage electric field, high and low frequency magnetic fields and radiation may be harmful to users, and the scanning technology they employ makes flickering unavoidable, causing eye strain and fatigue. Their surface is often curved and therefore the lines don't appear straight at the edges, hindering design focused activities.



LCD monitors, on the other hand, use a completely different technology. These monitors are not only more compact, they also consume less power. Inevitably, they are also more expensive than their CRT counterparts,

because of the complexity of the technology and the high rejection rate during manufacture. LCD monitors are also much brighter than CRT ones.

The only problem with LCD displays was that the person using it had to sit exactly in front of it—you cannot view the content on the screen from an angle.

This problem has been taken care of, to some extent in current LCDs. The phosphor in CRT monitors, on the other hand, emit light in all directions, making it possible to view content even from an angle of 180-degrees.


The sales of LCD screens are picking up, especially in the office users segment in metro cities. Since some LCD screens can be wall-mounted, these have found a place in departmental stores and public places such as railway stations, airports and hospitals for the display of information.


Apart from CRT and LCD, there are other display technologies such as gas plasma display, but due to the high prices involved, along with non-suitability for high-end graphics and games, these are not very popular.

Market Overview

LCD is fast becoming the display solution of choice in offices, thanks to its small size and elegant looks—not to forget prices that are dropping fast. For CRT the shift in the last six months has been from 15-inch to 17-inch monitors.

Small, 15-inch CRTs have become popular in the SoHo segment, where there is a need to cut costs. Another reason why users are increasingly opting for bigger monitors is the fact that high-end graphics cards are eas-





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ily available, whether it's for gaming, or for graphics applications.

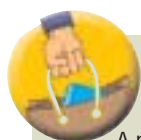
The cheapest CRT monitor currently available is from Krypton, whose 14-inch model (the 454LR) is available for under Rs 4,000. The most popular 15-inch CRT monitor is the Samsung 56V, which costs around Rs 5,800. This model appears to be a favourite with system integrators—largely because Samsung is a pioneer in bundling products, giving good returns in terms of value for money.

In the 17-inch CRT category, Samsung's 7535 is the choice of people looking for real value for money, with a price tag of Rs 7,100 to Rs 7,400. Other models that are pop-

ular with users include the LG 500G in the 15-inch category with a price tag of around Rs 5,800, whereas the LG 700G, with a price tag of around Rs 8,500, is a monitor of choice in the 17-inch category.

LCD monitors—a new craze among technology enthusiasts, CEOs and CTOs—have had a massive price drop of around 25 per cent over the past year. Further, LCDs are seeing a spurt in demand as many call centres set up bases in India. Hence, some major PC vendors have started bundling LCDs with their PCs, particularly Zenith, HP and HCL.

This has created more awareness among buyers. Seizing the opportunity, more vendors



Buying Tips for CRT Monitor

A monitor is an essential part of any computer system. After a bit of research, you'll be able to select a monitor with the size and image quality that suits your needs. The falling prices of CRT monitors are making larger monitors more attractive and affordable, and can reinvigorate your computing experience and keep you happy.

Dot Pitch

■ The first criterion to look for in a monitor is the 'Dot Pitch'. Every object and character on a monitor is made up of dots, and the distance between the centres of two dots is called the dot pitch. The smaller the dot pitch the closer the dots are to each other and the image on the screen will be that much sharper. Typically a dot pitch of .28 or less is good, anything above .28 will look grainy.

Screen Size

■ The monitor size is actually the size of the CRT measured diagonally from one corner to the opposite corner, but this is not the actual size of the image that you will see.

The actual viewable area will usually have

a smaller diagonal measurement. Most monitor manufacturers measure the entire glass of the CRT which extends beyond the monitor bezel (case) thus giving a false impression. For example, on some CRT monitors, a monitor sold as a 14-inch may have a viewable area of only 12.5 inches, a 15-inch may have 13.8 inches, a 17-inch may have 15.6 inches, and a 21-inch may have 19.8 inches. These figures may vary slightly from manufacturer to manufacturer.

Scan Rate

■ The scan rate is the period that a monitor takes for the electron gun to refresh the display. The electron gun inside the monitor scans each row of the display area typically a display with the resolution 1024 x 768 has 1024 pixels in a row and 768 rows. Each dot in these rows must be continuously refreshed by the electron gun as those dots (made up of phosphor) lose their charge quickly and begin to fade. The time it takes for the electron gun to refresh an entire line horizontally is called the Horizontal Refresh Rate, and this

is measured in kilohertz (KHz). The vertical scan rate is the time the monitor takes to scan the CRT from top to bottom, and is measured in hertz. The faster the scan rate, the less flicker the monitor will have.

Refresh Rate

■ This is a measure of the time it takes for the monitor to refresh the screen. It's calculated using the horizontal scan rate and the resolution of the monitor. Often the refresh rate is given in the manual provided with the monitor. You may come across the specifications 1,024 x 768 @ 75 Hz. In this case, 75 Hz is the refresh rate of the monitor. As a rule of the thumb, a refresh rate of 72 KHz or higher will produce a flicker-free display, provided your video card can produce a signal at that refresh rate.

Resolutions Supported

■ Typical resolutions include 640 x 480, 1,024 x 768, 1,280 x 1,024 and 1,600 x 1,200. Note that your video card must be able to support the higher resolutions as well. A monitor might support a resolution of 1,600 x 1,200, but the

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such as D-Link and CMV have jumped on the bandwagon to earn an extra buck—other brands such as Sony and Acer have even pulled out of the CRT segment and started concentrating only on LCDs.

Warranty is a major issue for monitors, and most vendors do provide carry-in warranty to the nearest location. Quite a few vendors provide a 3-year warranty on all available sizes. As LCD is a new technology, it demands more in terms of warranty—even a single pixel going out of synch could cause users to return their prized possessions. But industry sources mention that the standard convention is that if there are more than six bad pixels, the LCD

needs to be replaced.

Today, entry-level LCD monitors are available for Rs 18,000 and upwards. This is a stark contrast from the starting price of Rs 25,000, last year. Sharp has the widest product range, with around 17 monitors catering to all kinds of users. Right from first-time buyers (Rs 24,000 and up) to the rich and famous (Rs 1,00,000 plus). A lot of vendors from Taiwan and China are also making an appearance in India. The next couple of months might see some major changes in entry-level monitors, such as a shift from 15-inch to 17-inch; home users may even venture into the LCD market in a big way.



highest resolution available depends on the highest resolution that the PC's video card is capable of producing.

Controls

■ Take a look at the controls on the monitor. Every monitor allows you to adjust the screen image, brightness and colours. Three types of controls are available—analogue, digital and on-screen digital. Economy monitors offer analogue controls in the form of knobs or dials on the monitor case. Digital controls are microprocessor-based and more precise. Adjustments to monitor settings made with digital controls are saved when you turn the power off. On-screen digital controls allow adjusting the monitor with just a few controls and menu options which appear on the screen.

Older monitors only have brightness and contrast controls. New monitors have additional controls that can control the size and position of the display. The latest monitors allow for the adjustment of advanced features, such as colour convergence, vertical centering, vertical size, pincushion correction and many other adjustments. All CRT monitors have a degaussing circuit which zaps

away colour swirls produced by random (or the earth's) magnetic fields.

Features

Some monitors offer BNC connectors for red, green and blue signals, besides the standard 15-pin HDD VGA connector. Typically, monitors using these BNC connectors provide a sharper image. These BNC connectors will connect to a standard VGA connector via a special cable. This is usually included with the monitor, as no special video card is required.

Looks

■ Check out the focus and clarity of a monitor before you buy, as the clarity of monitors varies between brands. The only way to tell just how well a monitor will look is to physically see it yourself. So if possible, view the monitor while using the computer at several different resolutions. Remember, a good monitor will have a low Dot Pitch (.28 or smaller) and a high refresh rate (72 KHz or higher).

Anti-Glare Coating

■ Anti-glare coating on monitor screens makes images clearer. This anti-glare is obtained by spraying the monitor screen

with silica coating, which reflects light at different angles to eliminate glare. Older monitors often do not have this coating.


Warranty

Be sure to check out the monitor's warranty as the warranty can vary from 1 to 3 years. Some manufacturers offer on-site warranty, which means you don't have to ship your monitor or carry it into a service centre. With some monitors requiring two adults to lift them, an on-site warranty might prove handy. Also ask about where to get your monitor repaired when it is out of warranty.


Safety and Energy Ratings

Many monitors conform to a variety of power saving and low emission (electromagnetic) standards. A monitor conforming to MPR II guidelines states that it is within a set standard for electromagnetic energy emissions, which some studies have linked to health problems. Even stricter than MPR II guidelines are TCO guidelines. A FCC Class B rating states that the monitor conforms to a reduced amount of interference to nearby TV and radio reception. Consult the monitor's documentation for details.

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15
500G



17
700S



19
900B



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Buying Tips for LCD Monitors

LCD monitors use liquid crystal filled grids activated by electric fields to create smooth, finely defined images. Quality varies somewhat for certain LCD monitors.

Resolutions

Make sure that the native resolution matches the one you use regularly. Also, look for models with a one-touch auto adjust feature that matches your screen display with your computer resolution.

Dead Pixels

A problem with LCD screens is dead pixels. This refers to pixels that are either always 'on' or 'off'. After hooking up the monitor, run a totally white screen and look for stray black dots, then switch to a black screen and check for white or coloured dots. A few dead pixels won't seriously impact your display. But too many dead pixels or dead pixels in the wrong place can be a constant irritation.

Digital or Analog Inputs

Almost all flat-panel displays support analog input, which is the standard for PC video. All PC and Macintosh systems can produce analog output. If you want a sharper display, you can get an LCD monitor with digital input, called DVI (Digital Video Interface). To use the DVI input, you'll need a special graphic card with a DVI output connector.

Delightful Displays

With LCD's appearing in the market, users now have a new display that provides a far crisper vision, emitting less amount of glare.

Going by the market scenario, the 15-inch LCD, which was once priced at around Rs 35,000 is now placed at an affordable price of Rs 25,000. However, the 17-inch and 18-inch category that houses models such as Samsung SyncMaster171 MP, still remains unreachable due to its high price. LCD monitors use minimal desk space, have a crisper display, low power consumption and minimized eye strain, since there is no radiation. The newer technology incorporated nullifies the ghosting and streaking of images. Viewing angles have increased to 140 degrees with a reduction of contrast and brightness.

Smart Tips

Viewable area: Monitor size (say 17-inch) is measured diagonally. However, there is a maximum viewable area specification that you need to pay closer attention to in CRT monitors. This would be in the region of about 13.8 inch viewable for a 15-inch model and close to about 16 inch viewable for most 17-inch monitors.

Dot pitch: Dot pitch plays an important role in the crispness of the image. The smaller the diagonal dot pitch, the crisper the image. Diagonal dot pitch is more critical than horizontal dot pitch. For instance, a horizontal dot pitch of 0.24 mm usually corresponds to a diagonal dot pitch of approximately 0.28 mm. Most 15-inch monitors come with 0.28 mm diagonal dot pitch, whereas for the 17-inch models it's between 0.24 mm to 0.28 mm.

Screen Geometry: Screen geometry refers to the accurate display of shapes such as circles, squares and polygons. The monitor should be capable of displaying images without any geometric distortion. In most inferior monitors you will find that circles end up looking slightly elliptical in shape.

Video bandwidth: The higher the bandwidth of the monitor, the greater the range of resolutions it can support. Ideally, you should look for support for 85 Hz at the resolution you normally use, to avoid the flicker that will invariably take place at refresh rates of 60 Hz. This can add considerably to reducing fatigue, especially for people that spend a major part of the day sitting in front of their computers.



Decision Maker

	Office productivity	Home and Internet	Gaming and graphics professionals
You need	A display that reproduces crisp text for office applications	You are looking for display that fits into your overall PC budget.	A large display with a high resolution support and excellent colour reproduction
Look for	15-inch monitors	14-inch, 15-inch, or 17-inch monitors	19-inch, or 21-inch monitors
Our pick	View Sonic E53 (CRT), Sharp LL-T15V1 (LCD)	Samsung 753S (CRT), Samsung 171 MP (LCD)	Samsung SyncMaster 955DF (CRT), LG StudioWorks 995e (CRT), LG StudioWorks 221U (CRT)
Price range	Rs 5,500 (CRT) to Rs 33,000 (LCD)	Rs 12,000 (CRT) to Rs 75,000 (LCD)	Rs 20,000 and above



Also Remember...

■ Warranties from manufacturers are usually valid for one year. However, some manufacturers such as Microtek and Samsung offer a 3-year warranty on their products.

■ Integrated speakers, USB ports and a user friendly On Screen Display are other features that you might want to consider.

■ Models that come with flat picture tubes are generally more expensive.

Differences between CRT and LCD Monitors

Technology gets cheaper and better as time goes by. This is evident from the fact that faster and better processor are now available for much less than a few years ago. The same is the case with display technology. Some years back, LCD screens cost more than Rs 50,000, but now they come for much less—and with many more features. CRT monitors too have become cheaper; a 15-inch monitor can be had for as little as Rs 5,500 and a 17-inch for approximately Rs 11,000.

The technologies used to manufacture CRT and LCD are completely different. CRT monitors use a cathode ray tube which houses in it the electron gun at one end and a tough glass coated with phosphor at the other. The electron gun fires electrons towards the phosphor screen and the magnetic coil precisely deflect them from their path so that they hit the correct part of the screen. The screen is made up of phosphor dots which are placed in triad formation (in a colour monitor).

There are three electron guns; one each for red, green and blue. Each gun fires the electron on the corresponding dot. The screen is refreshed according to the refresh rate selected if it's 75 Hz, the screen will be drawn 75 times. Due to the width of the tube inside the monitor, CRT monitors are bulkier than their LCD counterparts.

LCD displays, on the other hand, are made up of liquid crystals. The technology used is more advanced than the one in CRT displays and calls for lots of precision. To light up the pixel, LCD uses a grid to supply the charge. Two glass layers are used as a substrate. One of the substrates is used as the row, and the other as the column, and are made of a transparent conductive material. This material is mostly Indium-Tin oxide.

These rows and columns are connected to

the on-board electronics, which control the charge sent to the rows and columns. The liquid crystal material is sandwiched between the two glass substrates and the polarising material is added on the outer side of each substrate. To make the pixel work (or turn it on), a charge is sent by the integrated circuit to the correct column and ground is activated on the row of that pixel. The row and column meet each other at the pixel to be turned on—and delivers the voltage to 'untwist' the liquid crystal at that pixel.

Why does LCD cost so much?

The cost of LCD displays increases dramatically even if the screen size increases by just one inch. The main reason is that many thin film transistors have to be incorporated within the additional space. Because the technology is still in its early stages and the rejection rate is very high (in large LCDs it can be as high as 40 per cent), good LCD displays sold in the market have to bear the manufacturing cost of the bad LCD displays that get rejected. The only way out of this vicious circle is further advancement in technology and more refined manufacturing techniques.

3D TFT-LCD Monitor

Advanced graphic cards have entered the world of computers, and they are capable of rendering 3D objects in real time. To complement this, some world-renowned monitor manufacturers have made 3D TFT monitors. These monitors make users feel as if images on the screen are real.

These monitors have a glass panel that is sandwiched between two LCD panels. Each LCD panel reflects half the light, allowing permeability. This effect creates the 3D sensation. Such monitors can be used in many critical areas such as medicine, fighter aircraft





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simulation, deep-sea projects and radioactive areas where humans cannot go. They are suited for 3D-gaming too, because they can add that extra depth to the game and make it look more realistic and playable.

These monitors have yet to make an impact in the local market because of the high price and complexity of the technology. But we can hope they will become affordable in future.

Easy on the eye

For anyone who spends more than couple of hours a day in front of a computer, eye strain is an important consideration. There are several factors that impact the eye-friendliness of a monitor.

Resolution: This refers to the sharpness and clarity of an image. For monitors the screen resolution is expressed as number of dots (pixels) on the entire screen. This means that a 640 x 480 pixel (or VGA) screen is capable



of displaying 640 distinct dots on each of 480 lines, which is about 3,00,000 pixels.

Refresh Rate: This is the rate at which each pixel is redrawn on a screen. If you view an image at lower refresh rates (say, 60 Hz), the images will flicker, causing eye-strain. The ideal setting for flicker-free viewing about 85 Hz, but 75 Hz is comfortable too. Make sure that your monitor supports a refresh rate of at least 75 Hz. If you have a powerful graphics card that can generate images at high-resolutions and refresh rates, make sure that your monitor is able to support them.

Radiation: Long hours spent in front of a monitor can cause severe headaches, and even permanent damage to the eyes. While modern CRT displays abide by the new, and stricter emission standards, it would still be advisable to use anti-glare screens to eliminate electromagnetic radiation (EMR) from the display.

Workshop: Setting Up Dual Monitors


The introduction of the graphical user interface (GUI) has made it a pleasure to work on the PC. But with more applica-

tions and more windows to work with, the strain on one's fingers has increased. This can be reduced through a smart option—dual monitors.



Working with dual monitors is always more productive because you can get your work done faster with having to switch within windows. The market is flooded with dual-monitor cards and their prices are falling fast. Big players like ATI, nVidia and Matrox have deluged the market with different variants of such cards.

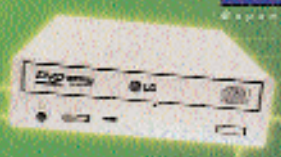
Another interesting thing is that manufacturers aren't just providing a dual-monitor-ready card, they're also making their cards feature-rich by providing TV-tuner compatibility. Now you can watch your favourite program on one monitor while you surf the net on another! These cards are also very simple to install and



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How to calibrate your display

■ How do you get a brand-new monitor to display an image that's as perfect as possible? The answer is to calibrate and characterise the monitor. Calibration removes colour casts, and sets a known white point on your monitor as a reference point for variation in brightness and contrast; and characterisation creates a monitor profile for use with a colour profile.

■ Specialised software are available for calibrating monitors. For PCs running Windows, a commonly used program is Adobe Gamma, which comes bundled with most Adobe products.

■ To calibrate your monitor, go to **Start > Run > Control Panel > Adobe Gamma**. Select the 'Step by Step' wizard. It will prompt you to give a unique profile name. Next, it will prompt you to adjust the brightness and contrast so that the centre box is as dark as possible. It will then display the phosphor that your monitor displays.

■ Adjust your gamma setting and set the hardware white point according to your preferences. Save your profile. The next time you boot your machine, the same profile will apply.

configure, as we shall soon discover.

A dual monitor set-up can be a boon for graphic designers and video or image editors, or for those who work with office applications most of the time. Imagine working on a video- or image-editing application with multiple images open. A dual monitor set-up allows you to reduce the stress and make the whole experience more fun. By enabling an extended desktop, you can easily space out the whole application across two monitors.

Another area is office applications. Working with different types of office applications like Word, Excel, Outlook and so on all at the same time can get cumbersome. The number of times a user has to task-switch between applications is simply mind-boggling. Here too, a dual display comes to the rescue. You can drag and drop applications of your choice in either of the monitors and work at ease. For example, let's say you like to keep Outlook open all the time to check

e-mail as soon as they arrive. But naturally that's not the only application you'll be keeping open. A dual-monitor solution allows you to avoid clutter—you can place Outlook on the secondary monitor while you complete your tasks on the main monitor.

Here's how you can get your dual monitor up and running in no time. Place the monitors side by side. Install the graphics card in the system and connect the D-Sub cables from the two monitors to it. If your card features a DVI port instead of an extra D-Sub port, use a DVI to D-Sub adapter. Switch on the

system. Your second monitor should get detected. Install the proper drivers for the second monitor and open display properties.

Now select the second monitor and click on 'Extend my windows desktop on to this monitor'. Click on Identify and check if your selection of primary and secondary is proper. And that's it—you're set!



The Future of Displays

Space has become a major cause of worry for the corporate segment. Even home users would like to have that extra space on their desks. And so, many people are turning to LCD displays.

CRTs have, over a period, tried hard to stay in the competition by offering flat tubes instead of the curved tubes characteristic of low-end monitors, and adding anti-glare glass to monitor. Some new monitors even have a dedicated button to set the display for normal, gaming or cinema mode, where the monitor adjust the best brightness and contrast for that particular mode.

LCD screens, on the other hand, are gaining wide acceptance in the market—data centres, banks and call centres are some of the main buyers of LCD monitors. Banks and

financial institutions tend to buy big-sized LCD displays as well.

So what's the new display technology taking shape in labs around the world? Plasma display is one technique that's been around for some time but this hasn't really made a mark because of the very high costs involved. Plasma displays are toys of the rich and famous and they'll continue to be that way for sometime. They are better for home theatres than for business purposes.

CDT Ltd, a UK-based company that licenses its patents and technologies to other companies, is developing a polymer organic light-emitting diode (OLED) display technology. Once this technology is implemented,





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LCDs will be thinner, lighter and consume less power than today's LCD.

But just like other new technologies that have already been developed but are waiting for mass acceptance, this technology will also need large quantities of key material and fabrication plants. The process will take time and lots of convincing—and much interaction with vendors—to adopt this technology.

There are two types of technologies in the OLED industry—small-molecule and polymer. Industry insiders say it will take another 10 years for this technology to become a serious threat to the LCD market. The number of steps involved in manufacturing the LCD is much more than it is in with polymer display. This ease of manufacturing translates directly to increased yield. This will help polymer displays compete with LCD in yield basis, and therefore it is just the matter of time before other manufacturers start adopting this technique.

But even if this technology takes off, past investments in LCDs will not go down the drain—there will be improvement in this technology as well. The current display market stands at \$50 billion and this will go up to \$85 billion over the next two years. This means there's space for new technology. In around five years, we will know if this new technology finds acceptance and whether we can buy products based on this technology, off the shelf.

There are many other technologies in the making such as Ferro Electric Display, Digital Light Processing (Micro Mirror, D-ILA-Direct/Digital Image Light Amplifier) which promise to be superior to the current technology. Some have already been implemented in a small way, whereas others are still in the development phase.

Companies such as Philips are working in the area of flexible displays, which will revolutionise the whole concept of interacting

with gadgets. Before long, mobile gadgets may allow you to carry information with you and access it wherever you want. Flexible displays can be wrapped on your sleeve and you can read the news from your favourite Web site, or spread it on the table to show friends a movie from your collection.

There are many ways to achieve the goal of making flexible displays. Silicon on plastic and polymer electronics are two ways to achieve this flexibility. To create an active matrix on plastic there are a couple of ways, the most common being transferring existing silicon process from

glass to plastic. Some prototypes using this method have already been unveiled by Philips, but a major hindrance in transferring the silicon technology to the polymer substrate needs to be addressed, so it may take a while before the technology becomes commercially viable.

On the CRT front, prices are expected to drop further, though there doesn't seem to be any point in manufacturing screens larger than 22-inch. The reason could be the huge footprint of the monitor, and the very small market for displays bigger than 19-inch. Gamers and designers are not using displays bigger than 19-inch because current graphics cards don't perform any better at resolutions higher than 1,600 x 1,200 pixels.

As far as technology improvements go, CRTs are more or less the same as they were a year back and there doesn't seem to be any significant change. Video bandwidth has improved, so even 15-inch monitors are capable of displaying 1,024 x 768 x 32 at a refresh rate of 75 Hz. Dot pitch has improved too, and now some monitors sport dot pitches as small as 0.22 mm.

To sum up, CRTs don't look as hot as LCDs and plasma displays do. While introducing the new iMac with its flat-panel monitor, Apple's Steve Jobs even spoke about "the death of CRT".



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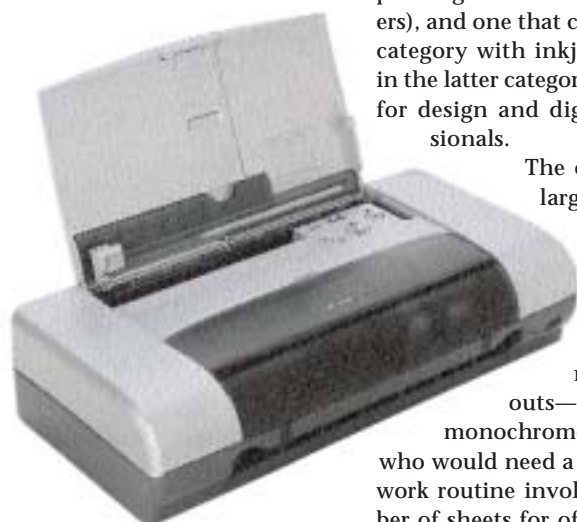


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PC penetration in homes and small offices has increased to such an extent that the need for peripherals such as printers has skyrocketed. Whether you seek a decent home printer, or a professional printing solution, the market offers a variety of options, depending on your need and budget. The printer market is divided into two major chunks, one that offers reliable bulk printing solutions (in the form of laser printers), and one that caters to the home printing category with inkjet printers. Also included in the latter category are high-end inkjets that for design and digital photography professionals.

The choice of printer depends largely on usage, than on quality of printing or performance parameters. Laser printers have traditionally been expensive, but they offer good economic and crisp print-outs—at least as far as bulk monochrome printing is concerned. So who would need a laser printer? If your daily work routine involves printing a large number of sheets for office use and, more importantly, you need the print-outs fast, you need a laser printer. If you're not satisfied with your old inkjet printer and are thinking of upgrading to something better and faster, and something that still fits your budget, you need to look at a laser printer.

Printing in offices and SoHo segments mostly involve bulk text print-outs and hence laser printers are the most viable options. Also, as these printers come with a network option—they can be used over a network as a shared resource, making them ideal for an office environment. Another important feature one should look for is the amount of buffer memory—the more the better, especially if the printer is on a network. Having a large paper capacity is also an added advantage for professional laser printers, for a fill-and-forget mode of operation.

Inkjet printers provide good colour print-outs at a reasonable price, hence they are more


or less suitable for the home segment, where the work load is occasional, and restricted to a few pages. High-end inkjet printers provide excellent digital imaging for professionals who require quality print-outs. In an inkjet printer, one should be looking at features such as USB interface, which increases printing speed drastically over the older parallel interface. High-end inkjet printers today have the facility to print from a digital camera directly. Some vendors also have specialised printers for the same job.

If you need a printer for the typical office environment, one that is going to be used as a shared resource, a laser printer is the best bet. But if you are looking for a home printer, to carry out small jobs, an inkjet printer will suffice. If you need a printer for a small office where you will be using it for just a few print-outs a day, opt for a mid-range inkjet printer that can do the job without burning a hole in your pocket.

Market Overview

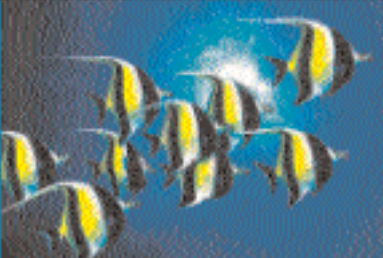
Gone are the days when people would shy away from a inkjet printer, or a laser printer simply because of the cost involved, and settle for an ageing dot matrix printer. Due to the fierce competition between the major players in the printer market, costs have drastically fallen, making them more affordable. This cut-throat competition among the vendors has benefited end-users in more than one way. Where an entry level inkjet printer used to cost around Rs 6,000 to Rs 7,000, a year ago, today the same printer costs around Rs 3,000 to 4,000. Similarly, an entry level laser printer that cost Rs 20,000 earlier, costs around Rs 13,000—a huge reduction when you look at the price to performance ratio.


The laser printer market, was previously ruled by two major brands—HP and Canon. But now companies such as Samsung, Lexmark, Wipro and Epson have entered the fray and the resulting competition among them has seen prices take a nosedive. All of these companies have slew of models that one can opt for depending upon the budget and requirements. Wipro offers the cheapest solu-



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tion at Rs 14,000. Similarly, companies such as Samsung and Canon have models ranging from Rs 14,500 upwards. HP and Lexmark also have entry level models costing around Rs 15,500 and above.

Today, the competition is fiercer in the inkjet market than in the niche laser printer segment, because a majority of prospective buyers—home and small-office users—don't find a laser printer economically viable. Major brands that have a strong presence in the inkjet segment are HP, Epson, Canon and Lexmark. HP has been around for a quite a while, and has used this advantage to build up a good reputation when it comes to inkjet printers. Lexmark offers the

cheapest solution with its Z13 inkjet printer. HP is not left behind and offers the cute little 3325. Similar models are also offered by Epson and Canon.

In the mid-range inkjet segment, Epson has some decent offers that offer excellent performance at a very good price, like the C61sx. Among high-end inkjets, Canon, Epson and HP have a plethora of models to choose from, such as the Canon S530D, Epson stylus 915 and the HP 7550. These photo printers are capable of printing photos directly from a digital camera, have good colour management controls and are provided with a small LCD for direct control.

Low-end inkjet printers start at Rs 3,000 and can go up to Rs 6,000, whereas mid-range inkjet printers are priced between Rs 7,000 and 16,000. High-end printers retail for anything over Rs 18,000.



Buying Tips for Inkjet Printers

■ Choose your printer based on the kind of print quality you require. In general, inkjet printers offer excellent quality as far as images and graphics are concerned, while laser printers offer the best text printouts.

■ If you are planning to buy an inkjet printer, make sure you check the page per minute (ppm) speed, since the manufacturer-rated speed is always relative to the printer's fastest print mode, and not the normal or best quality mode which are used more often.

■ If you intend to share the printer over a network, check the amount of buffer memory—the more the better.

■ If you are buying the printer for photo printouts, always take a test print to ensure you get the required quality. Also check if you need to purchase a separate ink cartridge for photo quality printouts.

■ Check for the type of interface supported by your PC. Most computers today have USB ports, so buy a printer with a USB interface since it offers higher speed of data transfer.

■ Consider the total cost of ownership and not just the purchase price. Depending on how many pages you print, even a small difference of a rupee will save you a sizeable amount of cash over the lifetime of the printer.

■ Check whether the printer supports additional features like ink status determination via software, so you can be sure when to

change the cartridge.

■ Check the manufacturer's Web site for the type of support offered—do they offer regular software updates, patches for new operating systems, and so on.

■ Check the space requirements of the printer so that it fits comfortably on your desk.


Buying Tips for Laser Printers

■ A carry-in warranty is definitely a big pain as far as bulky items like laser printers are concerned. The warranty should be comprehensive and on-site.

■ The greater the warranty period, the better. It indicates that the manufacturer has greater faith in the product.


■ Faster and higher quality printers are a lot costlier than slower ones. If you're in no hurry to take your printouts, or don't need excellent quality, set your sights a little lower. You'll end up saving much money that way.


■ With costly peripherals such as laser printers, it breaks your heart when they crash or malfunction. Add lousy customer service you are ready to throw the said peripheral out of the window. Ask people who've already bought printers about their experiences with the customer-support staff. It might take some effort, but is



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A Coloured World: Inkjet and Laser Printers

Inkjet printers have become popular due to the fact that they provide users with the ability to print in colour at a fraction of the cost of basic monochrome laser printers. The prices for inkjet printers begin from about Rs 5,000 and go up to Rs 50,000.

Laser printers are used in office environments, where fast, high-quality, economical and hassle-free printing is needed. Prices of laser printers begin from about Rs 17,000 for a basic laser printer and go up to over Rs 1,00,000 for a full-blown network printer.

Technology Insight

Inkjets work by placing

charged ink particles onto paper by using magnetised plates to direct the ink into the required patterns.

A laser printer uses a laser beam to draw the document on a selenium-coated drum using electrical charges. The drum is then rolled in toner—a dry powder-like ink. The toner adheres to the charged image on the drum, and is transferred and fused onto a paper with heat and pressure.

Smart tips

Resolution: This is measured in dots per inch (dpi), and is a rough measure of the image quality output.

Laser printers can better an Inkjet printer's output at similar resolutions in terms of quality and sharpness, as there isn't any smudging or spreading of ink.

Speed: Print speeds are usually inversely proportional to print quality.

Laser printers offer much higher speeds than Inkjets counterparts. Beginning at about 6 ppm, the speed can go as high as 45 ppm or more.

Colour: Although low-end inkjets don't offer great quality, the high-end ones offer photo quality output when printed at high resolution on glossy paper. Although the cost of printing each colour page is higher than comparable colour laser printers, the price of the printer itself is much lower.

Connections: Check that your computer has the right kind of port for the printer you have selected. While newer models have USB ports, parallel port models are also quite common. For networks, a printer should be able to

connect directly to the network and support the kind of protocols you use.

Paper: Check that the printer accommodates the paper sizes and volumes you plan to use.

Memory: Printers come with a buffer (RAM). A larger buffer allows storage of high-resolution documents or a larger number of regular documents.

Postscript for laser printers: It is important for laser printers to have postscript support. This decreases the time taken to print vector graphics—an advantage in pre-press set-ups and other such graphics-intensive print processes to create colour separation prints etc.

Also Remember...

■ The cartridge life is a number that manufacturers arrive at considering that each printout will print ink on only 5 per cent of each page. In reality, the life of a cartridge will vary according to the type of printing you do.

■ Duplexing is the ability to print on both sides of a page. It is a useful paper saving feature but usually costs slightly more.

■ To judge print quality, take a look at a few sample printouts on plain paper before making a decision.

■ Dpi ratings tend to be misleading.

	Medium volume printing	Heavy-duty printing
You need	Cheap, average quality, and decent speed printing	Money no bar, fast and quality printing
Look for	An A4 printer with a resolution of 600 x 1,200 dpi	Resolution of 1,200 x 1,200 dpi, and the ability to handle larger print loads
Our pick	Minolta QMS PagePro 1100	Lexmark Optra M412, HP LaserJet 1220se
Price range	Up to Rs 20,000	Up to Rs 50,000

	Home use	Intermediate	Professional
You need	Cheap, average quality and acceptable speeds.	Fast, better quality, larger paper size support	Photorealistic printouts, quality all important
Look for	An A4 printer with the ability to print colour. Resolution of 1440 x 720 dpi	Faster print speeds, photo cartridges or larger paper sizes up to A3	Resolution of 2,400 x 1,200 or 2,880 x 1,440 dpi. Six colour printing
Our pick	Canon BJC 3000, Epson Stylus Color 880	Lexmark Z52	HP DeskJet 990Cxi
Price Range	Up to Rs 8,000	Up to Rs 15,000	Up to Rs 30,000



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Power Tips

Inkjet printer

- It is very important to align the ink cartridge properly when you install it the first time. The software that comes along with the printer allows you to do this. All you have to do is click on the 'Align' button and the printer will automatically align the ink cartridges.
- Store the cartridges in the right packaging: Always store extra cartridges in their factory-supplied containers. If you regularly switch between colour and black ink, store the swapped-out cartridge in an old factory-supplied container or in a small, zip-lock bag.
- Always use your printer's power switch rather than the switch on a surge protector to switch off your printer.
- To avoid paper jams, clean the rollers and the internal mechanism with mild alcohol. Set the paper guides carefully when placing the paper in the tray for printing.
- The outside of the printer can be cleaned by spraying a mild glass cleaner on a soft cloth.
- Use the right paper. Most ink jets print reasonably well on standard A4 paper. However, the type of paper you use strongly affects the quality of inkjet output. Some grades of paper absorb too much ink, causing images to be either too light or too blurred. If you want the best image possible, use the paper recommended by your printer manufacturer.
- While printing photos, use manufacturer-recommended photo paper or the ink won't dry and the results won't live up to your expectations.
- Over a period of time, the prints you get will become faint and you will see lines running across the page. To restore the original print quality, many inkjets come with a nozzle cleaning function that blows ink through the nozzle and unclogs it. Use this feature on a regular basis if you use your printer only once in two weeks.
- For optimum and trouble-free performance, always insist on an original ink cartridge. Do not get them refilled to save money.
- Never shake the ink cartridge as this can create bubbles. Air bubbles in the cartridge can cause the printer to shut down.
- If you find ink leaking, do not attempt to open the printer. Call an authorised service person immediately.
- Don't place the paper stack in the tray without separating them as it could lead to paper jams.

Laser printer

- Select the proper location to place your laser printer. A properly ventilated area is recommended. Select a place where temperature

and humidity do not change rapidly. Try to avoid areas with heavy dust build-up.

- Position the printer on a sturdy and level surface, and allow sufficient space around the printer for air flow.
- Always use a lightly dampened cloth to clean the outside of the printer. To clean the inside, use a dry, lint-free cloth. This will ensure that no liquid enters the innards of the printer. Most manufacturers provide useful cleaning information on their manuals, so refer to them.
- Use paper that's been manufactured specifically for your printer, and select the correct paper type for your print job.
- Keep your printer up-to-date by downloading the latest drivers and patches from the manufacturer's Web site. This helps because most manufacturers provide driver updates for your unit, including patches that add fonts or correct incompatibilities.
- If debris is the primary cause of failure, toner is the primary cause of debris. All toner cartridges will release a small amount of toner into the machine. This is why it's important to clean the machine when you change the cartridge. It is important that the density control of the machine is properly set, to prevent the machine from pulling too much toner. We all like dark prints, but if your print settings are too dark, it could be detrimental to the life of the cartridge in the long run.
- Don't pile documents or miscellaneous objects on top of your printer, as they could damage it. Your printer may overheat and this could result in malfunctioning, and even a reduction in the printer life.



Smart Printing

A printer doesn't print only boring old text. You can go ahead and print pretty much anything you want.


You can print multiple copies of the same document without giving a print command each time. Whenever you select the Print option from the File menu or a printer icon, a small printer dialog box opens up. Here, under the 'Number of copies', just increase it to the number you want printed.

Are you one of those who head straight for the print command when you see something you like on a Web page?

Well, consider this. You can easily select specific parts of your document, so you don't have to print it entirely. This can obviously be helpful in saving ink. To do this, simply select the area or the part of the document you want to print. Now, in the print dialog box just choose Selection in under the Page range. Now your printout won't have banner ads or pictures that are of no use to you.

Many times it happens that you want to print at a lower resolution to save ink, or you want to print on both sides on the





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paper. Various printers offer different types of printing options, which you can use to suit your printing needs. Let's take a look at some of these options. Many printers also offer some kind of toner or ink saving mode, which lets you print really fast using much lesser ink. This is especially useful for printing drafts or rough copies of long documents.

The printer dialog box lets you print specific pages in a document, or a specific range of pages. You can also print multiple copies of the same document if you want. For more options you can click on the Properties button. This will let you do many things, such as select the resolution at which you want to print. A higher resolution uses more ink but gives better quality, and vice versa.

You can also choose to print on both sides of the paper, which comes in handy for things such as manuals or books. You can choose the size of your printing media, if you, say, want to print on envelopes or postcards. You can also change the orientation of your printout, so you can print in portrait or landscape mode.

Another very useful feature is the Print Preview option. This lets you see what your printout will look like after it's been printed, so wastage is minimised. You can even zoom in, and out of your document to get a better look at it. In most applications, this command can be accessed in the File menu by clicking on the Print Preview icon in your toolbar.

Do bear in mind that the exact options will differ with each printer model. The important thing is to be aware that they exist. So, whatever your printing demand, you know how best to meet the need.

Refilled and original cartridges

Inkjet printers are expensive to maintain primarily because of the high cost of cartridge replacements, and the costs incurred as a result of using poor quality cartridges.

It is very important to replace cartridges as soon as they dry up—keeping dried-up cartridges inside the printer for too long can clog the print head, causing poor quality printouts.

Users have an option of either using original cartridges or refilling them. Typically, users do not prefer original cartridges as they are expensive (Refill kits are available, which contain all the tools required for refilling inkjet cartridges at home). However, the problem with refill kits is that the ink provided with the kit cannot be used with all cartridges, since different cartridges have different standards. A single kit cannot provide a one-stop solution.

One could opt for compatible or replacement cartridges, which are printer cartridges manufactured by third parties or various OEMs. Compatible cartridges are generally of good quality and reliable because they are manufactured keeping in mind the specific printer model.

Another variety of cartridges that are extensively used these days

are recycled, also called re-manufactured cartridges. These are professionally recycled to guarantee high quality and good performance.

The bottomline is that there are reliable alternatives to refill cartridges, which are easy on pocket and at the same time, do not harm your printer.

New Interface For Printers

With the rapid growth in the usage of mobile devices such as handhelds and mobile phones that are capable of word processing, a need for printing the documents directly from these devices has led to the development of wireless printing solutions. And today we have many vendors coming out with printer models that support cutting-edge technology such as IrDA and Bluetooth.

IrDA is an acronym for Infrared Data Association. IR devices work using infrared technology, and hence don't require any cables to connect them to the printer. Using such printers, one can print

directly from a mobile device supporting IrDA interface without the need of any cables or even a PC. The only

shortcoming is the line of sight restriction—as the devices work using infrared rays, there should not be any obstacles between communicating devices.

Some HP printers with IrDA support are HP DeskJet 340, HP LaserJet 5MP, HP LaserJet 6MP, HP 2100M and HP4050N. Some of these are already available in India, and the rest will make it here before long.

Bluetooth is the latest addition to the ever-increasing plethora of interfaces available for printers.

Bluetooth is a low-cost, low-power, wireless radio frequency technology that allows various electrical devices to communicate with each other. These devices operate in the 2.4 GHz ISM (industrial, scientific, medical) band. One of the advantages of Bluetooth over IrDA is that close proximity between the communicating devices is not required, distances of up to 10 metres are allowed. Also, Bluetooth does not suffer from any line of sight restrictions.

A fascinating aspect of Bluetooth-enabled devices is their ability to communicate with each other spontaneously when they come within each other's range. Thus, a Bluetooth-enabled cell phone can be configured so that it can automatically print out all its stored messages using a Bluetooth printer as soon as you enter your office without any manual intervention. Another advantage of using Bluetooth is its support for point-to-multipoint communications. Thus, a single printer can simultaneously connect to both your cell phone, as well as your computer and any other Bluetooth-enabled device within its vicinity. The HP 995c Bluetooth printer is one such inkjet printer with built-in Bluetooth support, though it has yet to be available in India.





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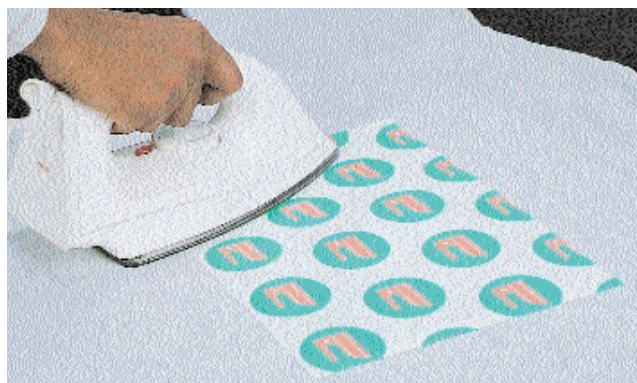


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Workshop: Iron-On Transfer Paper



STEP 1: Take a T-shirt and place it on a flat and firm surface like a table, so that the under surface does not bend and provides even heating to all parts of the paper



STEP 2: Now place the Iron-on-transfer paper with the printed side down on the T-shirt and arrange it properly so that the edges are parallel to the T-shirt's edge



STEP 3: Now set the iron to maximum heat and move it over the iron-on transfer paper so that it receives even heating across the entire area

STEP 4: Take care not to overheat the paper. Stop ironing when the paper turns slightly dark in colour. Carefully peel the paper from one edge. If you feel the transfer has not yet been achieved, continue with the ironing




STEP 5: After you peel one edge of the paper and see the transfer has taken place, continue to peel the paper slowly with one hand holding the T-shirt in place and the other peeling the paper



STEP 6: After peeling off the paper you will see a plastic coating over the printed surface. Don't try to remove it—it'll go once you wash it




STEP 7: Wear your attitude!



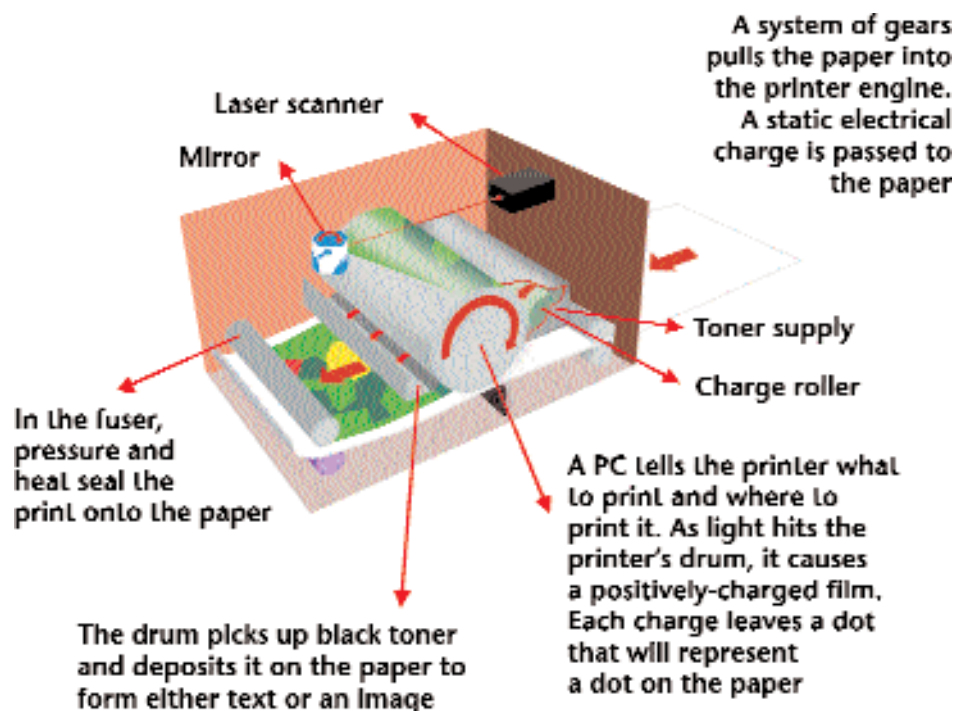
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Under the bonnet of a Laser Printer



Jargon Buster

Align: To line up typeset or other graphic material as specified, using a base or vertical line as the reference point.

Blanket cylinder: The cylinder which the inked litho plate transfers the image to the paper. The cylinder is covered with a rubber sheet which prevents wear to the litho plate coming into contact with the paper.

Bleed: The region of the page that is beyond the marked area within which printing usually occurs.

Buffer: Memory within the printer that stores data from the computer until it can be printed. Buffers vary in size, with the average for laser printers being around 8 MB. Greater the buffer, the better the handling of large print jobs.

CMYK: Short for Cyan, Magenta, Yellow and Black. These are the colours used in the industry-standard 'four colour process printing'. By combining these colours, a printer is able to print all possible colours. Most full-colour media that you see are created by this method (magazines, brochures, retail packaging, etc).


Coated: Printing papers which after making have had a surface coating with clay etc., to give a smoother, more even finish with greater opacity.

Cropping: The elimination of parts of a photograph or other original that are not required to be printed. Cropping allows the remaining parts of the image to be enlarged to fill the space.

Colour Balance: This term refers to the correct combination of Cyan, Magenta and Yellow required to exactly reproduce the colours of the original scene or object


Colour separations: The division of a multicolored original or line copy into the basic (or primary) process colors of yellow, magenta, cyan and black. These should not be confused with the optical primaries; Red, Green and Blue.

DPI: Short for Dots Per Inch, this is a measure of the vertical resolution of the printer. Higher dpi values (1200 and above) produce sharper printouts, while lower dpi values (300 and below) produce images that have noticeable dots in them.



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Duplexing: This refers to the ability of a printer to print on both sides of a paper. It is a very handy way of saving paper. However, this option is neither cheap, nor common. An alternative is to use manual duplexing. In this method, you print the odd, or even-numbered pages first, and once the job is completed, you manually flip the pages over and the printer prints on the other side.

Epson emulation: The industry standard control codes for dot matrix printers were developed by Epson and virtually all software packages and most dot matrix printers either follow or improve on these codes.

Halftone: An illustration reproduced by breaking down the original tone into a pattern of dots of varying size. Light areas have small dots and darker areas or shadows have larger dots.

Ink jet printer: Unlike daisy wheel and dot matrix printers, which rely on physical contact with the an inked ribbon and paper, ink jet printers simply spray ink in a series of dots to form characters. While early ink jets were prone to clogging, they were capable of delivering good print speeds and relatively high-quality text and graphics. Today's best ink jet printers have eliminated most of the clogging problems, rival laser printers for text quality, and can also produce color images with near-photographic quality—all for even less money than a low-end laser printer.

Interface: This is the type of connection that the printer has with the computer. Older printers use the parallel interface, but this has become obsolete. The latest printers use either USB or FireWire connections as their interface.

International paper sizes: The International Standards Organization (ISO) system of paper sizes is based on a series of three sizes A, B and C. Series A is used for general printing and stationery, Series B for posters and Series C for envelopes.

LASER: An acronym for Light Amplification by Stimulated Emission of Radiation, it is a process that produces a very intense light beam. In a laser printer, this beam is used to fuse the toner, or ink, onto the paper.

Layout: A sketch of a page for printing showing the position of text and illustrations, and giving general instructions.

Overprinting: Printing over an area already printed. Used to emphasize changes or alterations.

Pantone: A registered trademark for an ink colour matching system.

Printer Command Language: A language developed by HP for use with its own range of printers. Essentially a text orientated language, it has been expanded to give graphics capability.

PostScript: This is a computer language, or protocol used for communication between the computer and the printer. The computer sends information about the pages to be printed by the printer in PostScript format.

Print engine: The parts of a page printer which perform the print-imaging, fixing and paper transport. In fact, everything but the controller.

Progressives: Colour proofs taken at each stage of printing showing each colour printed singly, and then superimposed on the preceding colour.

The Future of Printers

The advocates of paperless environments had predicted the death of the printer. Concepts such as e-mail, e-paper, e-books and digital collaboration have certainly taken us closer to a paperless work culture. However, the printer is here to stay. The dot-matrix printer, once the norm, is dead—it's limited to billing and accounting applications. The future lies in laser printers. Currently though, inkjet printers rule when it comes to photo-quality printing.


The past few months have seen the emergence of a new breed of inkjet printers called 'photo-printers'. Earlier, a user needed to download images from a digital camera to his PC before taking a printout, a photo-printer connects directly to a digital camera supporting this feature, allowing you to get your prints straight from the camera.

What's more, their light weight and compact size allow complete portability. HP's Photosmart 130 and Canon's CP100 are

two such printers. The availability of specialised photo-printers such as these is all the more relevant because of the current boom in the digital camera industry. Due to falling prices, more and more people are now buying digital cameras instead of normal film-based ones, and a whole range of models are available from various vendors that cater to enthusiasts and professionals both.

Not too long ago, laser printers were expensive, and out of reach for the average SoHo user. Even with its long-term benefits and convenience, price proved to be a stumbling block. However, the past few months have seen significant reduction in the prices of laser printers, bringing a wide range of options that suit the requirements of various kinds of users—from SoHo to large corporates that require networking capabilities, storage and paper management—built into the printer.






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Buyer's Guide

SCANNERS



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What better way to show your better half how much you love him or her than by putting their picture on your desktop? You'll need to know how to use a scanner, of course. No sweat. Place the desired picture on the scanner glass, push a single button without even starting a software, and hey presto—the picture's scanned and ready to be put up as your new wallpaper!

Scanners have become so readily available, and user-friendly that almost anybody can use them. They've become a great multipurpose tool for the office and the studio. From enhancing Web sites to digital data management, scanners make it all possible.

Scanners have become popular because people like to digitise the analogue life we live—the average person wants a colour scanner for photos, graphics, or plain document scanning. A small to medium business enterprise might look for a scanner that can do fast black-and-white scanning, which can later be OCR-ed into editable text. Graphic artists or desktop publishers—and professional imaging studios—might seek an ultra high-end, specialised, feature-packed photo scanner.

But how do you go about choosing a scanner? Is a 36-bit scanner better than a 48-bit scanner? What about resolution? Do you need 600-dpi (dots per inch) or will 300-dpi be sufficient?

Well, most home users should find a 300 dpi scanner sufficient. However, power users need to have a minimum of 600 dpi. Speed is also another factor which you should consider. A scanner may be sleek and have support for high resolutions,

but if it scans at a snail's pace, your investment's not going to be wildly useful. Hence, before buying, always scan a document to check the speed and look for the ability to reproduce colour adequately.

Go for a USB scanner rather than one that's parallel port-based, as this will give faster speeds. Also, make sure you buy a scanner that you gives you a reasonably good image-editing and OCR software bundled with the product, so you can save some money on software. The warranty should also be carefully checked, especially whether it's 'carry in' or not.

Scanners have not really been an integral part of a regular home PC user, and the last couple of years have not seen any major technological enhancement. Most of the home and SoHo segment have been buying scanners mainly for scanning photographs, and the falling prices of digital cameras has affected this segment. The only major technological enhancement perhaps has been in the interface, where the shift has been from Small Computer System Interface (SCSI) to Parallel to USB 1.1. Of late, some scanners even ship with USB 2.0.

Entry-level scanners available in the market today cost Rs 3,500 and up. The Benq S2W 4300U and HP Scanjet 2300 are available at a rock-bottom price of around Rs 3,500. With very few players (and Epson opting out of the race) the competition in this segment is severe. Another problem with such scanners is that of heavy wear and tear during transportation, which leads to malfunctioning of devices to a great extent.

HP is the undisputed leader, with around 50 per cent marketshare. HP is followed by Canon and Umax. With all vendors understanding the market reality, the focus now is shifting towards multi-functional printers (MFPs), or AIOs (all-in-ones) as some vendors prefer to call them. The focus is to provide a low-cost solution and save precious desktop space for users.

Market indications are that low-end inkjets and scanners would be phased out over the next few months, and the home and SoHo segment are likely to go in for these multi-functional devices instead.



Buying Tips

- Select a hardware resolution depending on the kind of document you are going to scan; for example, 300 dpi is not enough if you plan to scan photographs
- Check the packaging contents and make sure that the requisite cables and connectors are included
- Check whether the vendor gives carry-in or on-site warranty—on-site warranty is a better option as the technician comes to your place for repairs
- A transparency adapter is a must if you are going to scan negatives. Also ensure that the scanner has an interface to connect the required adapter
- New scanners might have thermocol bits on their inner sides that will show up as black dots on the media scanned. Remove such particles from the scanner by wiping it with a soft cloth and make sure there are no scratches on the glass surface
- If you're scanning thick books or such, go for a scanner with a removable lid, or one where the lid can rise to a height of two inches or more
- 36-bit scanners are on their way out; 48-bit is now considered entry-level for scanners.
- A good OCR and imaging software bundled along with the scanner will not only save you additional investment, but will also extend the usability of your scanner



hp Scanjet 2300



Scan and create family albums.



Also Remember...

- Upgrading your system RAM is probably a good idea if you are going to be scanning high-resolution images. This will have a significant impact on overall scanning performance.
- Check for sRGB support. This is a new standard that makes Web images look better.
- Consider buying a transparency adapter if you plan to scan negatives, slides and transparencies directly. Automatic document feeders (ADFs) are a boon to people with large text scanning needs.
- To get good results with 35-mm slides or negatives, you should look for a special scanner that has been designed for them.
- Ensure that your printer is good enough to reproduce the high quality scans that the scanner produces.

A quick scan

The scanner, which used to be a luxury not so long ago, is now well within the reach of most people. Prices have fallen, due to competition between manufacturers and also due to the advancement of the technology used. This has put it high on the shopping lists for many home users. Today, scanner prices begin at about Rs 4,000 and offer pretty acceptable performance in terms of quality and speed. USB has helped ease the pain of installing the scanner, and increasing speed due to the higher data transfer rates it supports.

Technology Insight

The main components of a scanner are: a light sensitive diode, a light source, the lens, and the stepper motor—which moves the scan head and the mirror on which the document is placed. The light hits the document and the image is reflected back to the diodes via mirrors. The image is then focused on the CCD array, which converts photon into electrons, thus converting the image to digital format.

Smart Tips

The light source: This is either a cold cathode fluorescent lamp (CCFL) or Xenon lamp.



Xenon lamps provide better performance.

Resolution: The higher the resolution of the scanner, the sharper will be the image reproduced. Most low and mid-range scanners today have an optical (or hardware) resolution of 600 x 1,200 pixels. Here 600 is the number of CCDs or CIS (Contact Image Sensors) that are arranged in a horizontal row, and 1,200 means that the stepper motor is capable of moving in steps of 1/1200th of an inch.

Platform size: For most home users, A4 size scanners are sufficient. However, for professional uses, a scanner with an A3 sized platform is preferred.

Colour depth: 48-bit colour depth is preferred, and you should not opt for anything less than 36-bit colour depth.

Connectors: If you have a free USB port in your system then a USB scanner is the recommended choice. Parallel port scanners have lower data transfer rates, and although the SCSI models offer the fastest rate, they require you to buy special adapters.

OCR software: Most bundled OCR software offer basic functionality. For heavy text-based scanning you should look to buy third-party OCR packages, such as ABBY FineReader 6.0.

Decision Maker

	Basic use	Intermediate use	Professional use
You need	Something that you will use occasionally to scan home photos or something from a book or magazine	Something for more serious scanning, either for text documents or images	A scanner with high resolution and speeds because of large volumes of scanning
Look for	Any A4 scanner, with USB support and a minimum resolution of 600 x 1,200 dpi	Any A4 scanner with USB support and a minimum resolution of 1,200 x 2,400 dpi	A scanner with 1,600 x 3,200 dpi or better resolution, A3 platform size and preferably a SCSI interface
Our pick	UMAX Astra 2500, HP ScanJet 2300C	HP ScanJet 3500C, UMAX Astra 4700	HP ScanJet 4570C, HP ScanJet 4500,
Price range	Below Rs 5,000	Rs 5,000 to Rs 12,000	Rs 12,000 to 20,000



hp ScanJet 3500C



Scan and create family albums.



Power Tips For Better Scanning

Scan Smart

Select your scanning area: Instead of placing a document or image and scanning the full area, always select the area to be scanned. This will reduce scanning time, as well as file size.

Resist scanning at high resolutions: If you intend to scan your documents only for viewing on a PC or on the Web, scanning at a resolution of 100 to 150 dpi is usually sufficient as monitors can only display at 72 dpi, and scanning at any higher resolution for this purpose would be useless. However, if you intend to print your images, you should scan at a higher resolution.

Using descreen: When you scan content from magazines or newspapers you will notice moiré patterns on the content. The best way to reduce this is by using the Descreen option that comes within the TWAIN drivers. If you have a scanner that does not have a descreen option in its scanning software, you can minimise this effect by applying it from an image-editing software.

Save format: First identify the target format you would like to save the image in. If you are using it for the Web or for animation, it would be appropriate to save it as a JPEG or GIF, as these save a lot of disk space. But if you would like to send the image for printing, TIFF is the best format as it can compress the image with no loss in image quality.

Correct ghost images: A ghost image occurs when the scanner picks up images from the back of a page. Often this can be corrected by changing the brightness and contrast controls. You will have to experiment to find the best setting of these controls for your particular scanner.

OCR scanning: Almost all scanners come with Optical Character Recognition software, but this is usually a stripped down version of a full package that the software company wants to sell you. Although these packages lack some of the sophistication of full-fledged OCR programs, they are much simpler to use. Simpler programs sometimes have problems with multiple columns of text, or documents that include photos and logos, etc. There's an easy solution to this. Photocopy the original and cut the columns into strips and remove the photographs. Now identifying the text for the OCR software will be much simpler.

Adjust brightness, contrast and sharpness:

Often you may notice that a bright image turns out pretty dull when scanned. This can be easily manipulated through the Twain driver (if it is supported), or through an image-editing software that lets

you increase the contrast and brightness levels so that the dull image looks much brighter.

Accessories for your Scanners

If you thought your scanner was intended just for scanning images, you'll be in for a surprise—you can do much more than casual scanning. All you need is a couple of accessories such as:

Transparency adapter: With this, you scan negatives, slides, and larger transparencies.

Automatic document feeder: This will let you feed a stack of pages for scanning without having to manually place each page on the scanner.

Software: Whether you need to use your scanner for faxing, copying, optical character recognition or graphics, you'll need the right software to do the job. Depending on what the manufacturer bundles with the scanner, you may need to buy additional software. Be sure to consider the added cost when comparing prices.

Care and Maintenance

If you find the images you are scanning are smeared with light or dark stripes, or displaying a chequerboard pattern, it's time you cleaned your scanner glass. In order to effectively clean the glass, unplug your scanner and raise the front lid. Apply a very mild streak-free cleaner to a soft lint-free cloth and clean the glass. Now, dry the glass with a soft cloth.

Do's:

- ✓ Always unplug your scanner before cleaning it
- ✓ Place your scanner away from heating vents or windows, or other locations where moisture might affect its functioning.
- ✓ Always keep the scanner on a level surface so that it has a good grip, otherwise the mechanism carrying the CCD and fluorescent lamp may get damaged over time

Don'ts:

- ✗ Never apply solution directly on the scanner glass. If you find that the glass is dirty or has a slight dust or smoke film underneath and on the inside, do not unscrew the lid and try to clean it from inside. It's always advisable to call an authorised service centre.
- ✗ Never use abrasives, isopropyl alcohol, benzene, acetone etc on the scanner glass, as this will streak and cloud the glass, and can even cause damage.
- ✗ Never place your scanner near heating vents or windows, or other locations where moisture might affect its functioning.

Also remember:

If you are moving the scanner from one place to another, make sure that the transportation lock is enabled, as this prevents the CCD array mechanism from moving. Push down the lock, which is located at the back of the scanner. Remember to unlock the scanner before you attempt to operate it, or you may end up damaging it.



OCR Tips

- Always choose a scanner that has a white surface under the lid—this will give more accurate results.
- Always keep the document flat, and see that there are no wrinkles or folded corners—this may produce black patches.
- Look for de-skew and despeckle options. This will give more accurate images and also increase the accuracy of OCR software.
- Do not scan a document with black fonts on white background in line-art mode; it will return very poor results. The results will not improve even if you increase the resolution. Use greyscale mode instead.
- 48-bit setting at 200-dpi is more than enough for most new OCR software. If the document has images, increase the resolution to 300-dpi, and preserve the format of the document.

Hotkeys

Scan to Fax: This lets users fax documents using an application that comes bundled with the scanner. It needs a telephone (not a fax

machine), connected to a PC through a modem. This transmission uses the TAPI protocol.

Scan to Print/Copy: This allows users to print a scanned document directly from a locally connected or network printer. The document is saved as an image, which can be used later. This saves you the trouble of initialising the printer program to take the print-out.

Scan to e-mail: This feature lets users mail the scanned document directly. The moment the Scan-to-mail button is pressed the system initialises the default mail client. Type in an e-mail address, and hey presto, the scanned document gets mailed instantly.

Scan to OCR: This is a new addition that's becoming quite common. It scans the document and initialises the OCR software. Scanners that have this feature are usually bundled with an older or light version of OCR software.

Scan to CD: This relatively new feature scans the document and burns it directly onto a CD, saving lots of hard disk space, and imparting mobility to your data.

Scan to Post: This scans the image and posts it directly to a Web page. You save on the time taken to open a browser, typing in the Web address, and uploading the image.



The Future of Scanners

With the growing popularity of digital cameras, scanners have been pushed out of the average home user's shopping list. However, quite a few users still feel the need for one, especially the flatbed models. They are used to turn paper documents into files, digitise photos and e-mail them, make reprints, and upload images to Web sites. In the business sector, scanners help to create brochures, presentations and Web content. There's never been a better time than now to purchase a quality scanner at a low price.

Flatbed scanners are the most in demand as compared to other types, primarily because they can easily scan bound documents such as books and magazines. Several flatbed models now offer automatic document feeder (ADF) attachments and can scan transparencies and film negatives as well. As a result, both sheet-fed scanners (which scan loose pages) and handheld scanners (that require users to move them across a document manually) are now almost history.

The popularity of flatbed scanners can be expected to grow as manufacturers make more improvements in design and ease of use. Look for the incorporation of one-touch button functionality, which allow users to bypass the process of using software programs to perform specific functions. A good


option is the one-button approach that automatically completes tasks, such as sending a scan directly to a printer, or faxing a scan.



Another improvement that will definitely continue is the increased number of scanners using a USB port to connect to computers, rather than parallel ports. USB connections are easier to use and provide faster scan rates. It is also likely that mid-range and high-end models will continue to include a SCSI connection, which are even faster, but require users to install a SCSI controller card inside the computer.


In the future, you can expect to see an increased availability of speciality scanners as well as multifunction devices (MFDs) with scanning abilities. Specifically, look for the digital-imaging craze to catch on so that models are expressly designed to scan existing film photos, 35 mm negatives and slides. These models will scan at a higher resolution, produce better results and provide users with an alternative to buying a digital camera.


However, scanner prices are unlikely to fall much lower than they are today. Today's models represent great value—and are an asset for any serious computer user.



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Buyer's Guide

HARD DISK DRIVES



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Full page AD

With every passing year, the performance and capacity bar of digital storage technologies has been raised. This is good news for computer users, as the need for larger and faster storage solutions is imperative, considering how resource-hungry today's applications and operating systems have become. Usage patterns have also changed rapidly, and the home PC is now increasingly used for data-intensive tasks, such as ripping entire Audio CD collections to MP3 files and making VCDs of special occasions to share with loved ones.

The digital age has brought with it the need to store vast amounts of data, which has in turn created a market that witnesses the spawning of bigger and faster storage devices with amazing regularity.

Of course, all of this would mean little if the devices in question weren't affordable. The good news is that thanks to a very competitive market and demanding consumers, the storage subsystem has kept pace with the bandwidth demands of today's applications, and 7200 rpm hard disk drives with a minimum storage space of 40 GB and above are now more common than ever before.

Market Conditions

The demand for storage in PCs has

boomed. With a lot of multimedia files being used today, including MP3, Flash files and movies—even today's entry-level 40 GB hard disks aren't enough for users. The cost of a 40 GB hard disk ranges from Rs 4,300 to Rs 4,500.

On the other hand, 60 to 80 GB, 7200 rpm drives are also available and are preferred by professionals. These are available for Rs 8,500 to Rs 9,000. Seeing the demand for higher capacity drives, Maxtor recently launched its 250 GB hard disk in the IDE interface for around Rs. 16,000. With Serial ATA hard disk technology knocking at the door, users might once again see an upheaval in the coming months. This technology, although its infant stage would really push the existing ATA 100/133 to its end due to the sheer fact of ease of use and low power consumption as compared to the existing drives. As it uses a much smaller interface connector and cable, the space inside the cabinet increases and provides for more efficient cooling.

Today some of the drives available are as fast as 15000 rpm which are extremely good for multimedia applications such as ripping of movies and MP3 songs. Due to the speed, these drives generate a lot of heat and thus need special cooling, for which vendors, such as Antec have launched special hard disk cooling devices that bring down the temperature of the disk by around 10 to 15 degrees—this enhances the performance as well as the life of the disk. Although not popular yet, it has many followers with users looking for performance.



Buying tips for Hard Disks

■ Speed or space? If you need to store MP3s and DivX films, or to back up heavy image files, buy the largest hard disk you can afford. On the other hand, if you extensively use applications such as image editing or audio processing software, look for the fastest hard disk you can afford—at least a 7200 rpm drive - and buy the largest in that speed range.

■ Research the market. Ask your friends or dealers you know, or search the Internet for information about the manufacturer, the reputation they enjoy and their after-sales service.

■ Check the warranty. Apart from the time frame covered, also check the type

of warranty. Some manufacturers will replace the hard disk only in the first year, after which they will only repair it. This is rather unreliable and can lead to more problems in the future.

■ Confirm the time it takes to replace a faulty hard disk. This is especially important if your business relies heavily on data storage. Generally, manufacturers who run a service centre are able to provide quick replacements, while those who don't have service centres could take weeks to replace a faulty hard disk.

■ Check for accessories such as IDE cables, disk management software and operating manuals.

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Pick a Platter

Today, the entry-level drives are the 5400 rpm drives, which deliver sequential read and write speeds of about 25 MBps. This is sufficient for applications such as word processors, Internet surfing, etc. These drives are at least ATA/66 compliant, which implies a peak theoretical transfer rate of 66 MBps.

The higher performance 7200 rpm IDE models are generally ATA/100 compliant and are ideally suited to applications such as audio and video processing. The prices for these drives begin from Rs 4,000 to 4,300 for a 40 GB unit. The brand-new Serial ATA (SATA) drives support the ATA/150 standard. SATA II in fact even goes as far as enabling a theoretical throughput of 300 MBps! An 80 GB SATA drive costs around Rs 10,000.

When it comes to sheer performance, however, the latest SCSI technology still takes the honours with a theoretical transfer rate of 320 MBps, and the ability to daisy chain several devices on a single controller. However, this technology comes at a high price.

Smart Tips

Capacity: For most users an entry-level 40 GB drive would be sufficient. However, IDE drives of capacity up to 250 GB are available. SCSI models are available in sizes ranging from 9 GB to 80 GB.

Rotational speed: This refers to the spindle rpm of the drive under consideration. Higher spindle speeds lead to faster read and write performance. These range from 5400 to 7200 rpm for IDE drives and 7200 to 15000 rpm for SCSI models.

Sustained data transfer rates: This is a measure of the drive's performance in terms of data transfer to and from the drive. This should be about 20 to 30 MBps for 5400 rpm drives and 30 to 50 MBps for 7200 rpm drives. The new SATA drives support even higher rates.

Average seek time: This is the average time taken by the drive to access data stored on the drive. A time between 5.5 to 10 milliseconds is acceptable for most mainstream applications.

Data buffer (cache): This is the amount of onboard memory that the drive possesses. It increases transfer speeds when data is copied from one location in the drive to another. This ranges from 512 KB in the 5400 rpm drives to as much as 8 MB in the 7200 rpm IDE models. The most common data buffers size is 2 MB.

Motherboard/IDE controller card: In order to tap the full potential of a hard drive, you need to make sure that your motherboard's IDE controller supports the same specification (ATA/66/100/133) interface. If you're buying a SATA hard disk, your motherboard should have onboard SATA support, else you'll have to buy a controller card as well. Finally, be aware that there are two types of SATA controllers—native and bridge. A bridge merely acts as a connection between a SATA drive and the motherboard's standard parallel ATA interface, while a native controller is a true SATA controller. Since a bridge uses the same underlying technology that runs the current ATA interface, it wipes out SATA's performance advantage.

Decision Maker

	General home use	Focus on capacity	Cost no bar
You Need	A hard disk for general applications, such as word processing and Internet surfing	Large data storage capacity and speed is not such an issue.	You want the maximum capacity available. Speed becomes a top concern as well. Price is not a problem.
Look For	40 GB, 7200 rpm, supporting ATA/100 transfer rates.	A minimum of 80 GB, 7200 rpm, supporting at least ATA/100.	A 200 or 250 GB drive at 5400 rpm or 7200 rpm, supporting at least ATA/133.
Our Pick	Samsung SP4002H	Seagate Barracuda ATA IV 80 GB, Western Digital WD1200.	Maxtor DiamondMax 16 250 GB
Price Range	Up to Rs 4,500	Up to Rs 6,500	Up to Rs 25,000

Power Tips For for Using Primary Storage

How Much Space Is Enough?

Depending on your computing needs, users can be classified into the following types:

Less is good...

...if your time on the PC is spent surfing the Internet and maybe creating a spreadsheet or two. A hard disk with the bare minimum capacity should be enough for you. The same holds true for businesses where the PC is primarily used for accounting and billing purposes, or for creating letters and spreadsheets. A 40 GB drive should be sufficient, that's the entry-level solution available today. Given your frugal need for space, this hard disk should last you several years.

Size does matter...

...if you're a typical home user who stores the latest applications, MP3s, videos, movie trailers and even full-length movies, not to mention space-hogging games. No amount of space is ever going to satisfy you. Go for at least a 60 GB drive. If you feel you might exceed that as well, 80 GB might be more appropriate. Space also matters if you use CAD/CAM software, or are a graphics professional with a penchant for 3D animations.

Speed is your mantra...

...if you are a power user, but lack the purchasing power to buy a SCSI drive. Consider a 7200 rpm drive—the capacity you get would depend on how much you can afford, but an 80 GB drive should suit you just fine.

5 Tips to Keep your Drive Shipshape

- Protect the drive from shocks and jerks.
- Always handle the drive by its side. Never touch the underside of the drive or the drive electronics.
- When installing the hard drive, take care to screw it firmly to the chassis of the computer to protect it from vibrations when using the PC. The maximum damage that a drive suffers is usually due to improper handling during installation.



Also make sure the screws that come with the hard drive match the bore size on the drive.

- Never try to open a hard disk if it fails to respond. Even a particle of dust entering the insides of the drive can destroy the platter on the disk.
- Enable S.M.A.R.T. from the BIOS. This slows the drive down, but the difference is hardly noticeable for most applications - only 2-5 per cent. S.M.A.R.T. is a technology that warns you when there's a problem and the drive is about to fail.

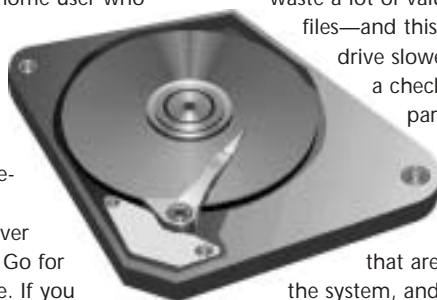
Tip For Organising Files And Folders

As you install more programs, the number of files and folder naturally increases. If you're not properly organised, you will waste a lot of valuable time searching for files—and this also makes the hard drive slower. The best way to keep a check on this is by partitioning the hard drive and allocating each partition a size according to the number of applications that are going to be installed on the system, and the amount of data that will be stored.

Here are some simple tips.

- Always store files and folders on the secondary partition.
- Name the folder according to the data being stored in it—such as 'Accounts' for files relating to accounts.
- Name the files in such a way that it carries enough information regarding its content, date it was generated and the name of the concerned person.
- Keep separate folders for different kind of files, such as images, spreadsheets, text documents and so on.
- Try not to install games, application and other system utilities on this partition as it will clutter the disk with other kind of data and slow down disk access.

Over a period of time, as a lot of data is stored and deleted it becomes imperative to defragment the data, which essentially means rearranging the data at one place so that access becomes faster. Windows itself provides you this utility, so you need not bother installing a third-party



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program. To access this utility, go to *Start > Program > Accessories > System Tools > Disk Defragmenter*. The time required to complete the defragmentation will depend on the hard drive capacity.

Another very useful built-in option you get with Windows is Scandisk, which can also be found in System Tools. It checks the hard drive for any errors—lost clusters, bad sectors, etc. You should perform this task once a month to keep your hard drive free from errors.

Software To Repair And Diagnose Hard Disk Errors

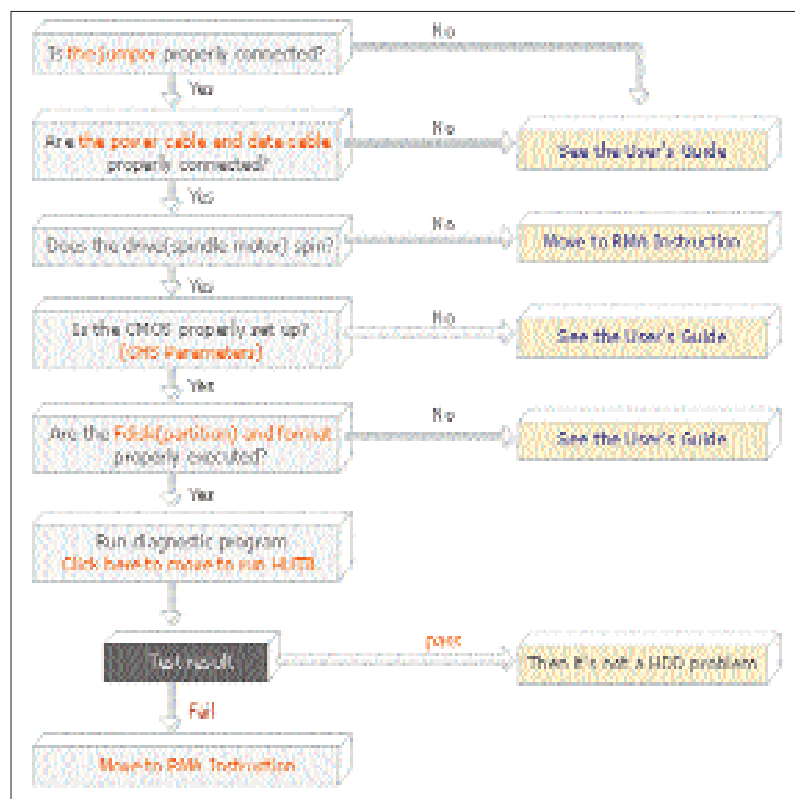
The hard drive is one the most important devices in your computer. It not only determines the amount of data you can save, but also affect the performance of your system. It's a very sensitive device, so even small shocks could make it unusable. Bad sectors are a common problem most users face. The desktop-level utilities available for such a problem are very basic and cannot eliminate such bad sectors. However, hard drive manufacturers have taken pains to develop utilities that take care of many such problems.

Is it really a hard drive problem?

If your system crashes endlessly and the program refuses to load, you may feel it's a

problem with the hard drive. But the main cause could be something else—such as file corruption, a virus, damaged boot area etc. What you can do before going to the repair centre is to attach the hard drive in another system and take a backup of important data. After this, if you have the disk repair utility handy, run it and try to analyse the problem. If this exercise fails, format the hard drive and try to reload the OS and other software. If this is successful, go ahead with further installation. If it fails, the only option is to go to the service centre for repairs.

SHDIAG is a program that is used to diagnose hard disk problems. It works in DOS mode. The program automatically detects different hard drives attached to the system and asks the user to select one. We recommend that you take a backup of your data before proceeding. Six different parameters of the hard drive are tested by SHDIAG. If there is no error found, it will complete the test and stop. If an error is found, the utility asks for permission to perform a low-level format. If the user press 'Yes', all information on the drive will be lost. If the problem still persists, check the cables. Unplug the hard drive and try either a different cable or different connectors on the same cable.



Workshop: Backing up your Data

Clone Me

Hard disk cloning is nothing but a process by which you create an image or clone of your hard disk for fast and easy recovery of the operating system during disasters. This image could either be stored on another hard disk or a CD.

There are many hard disk cloning software available today, such as Drive Image PRO, Norton Ghost, Instant Recovery etc.

Some advantages of using hard disk clone software are:

PC Migration: When you shift between PCs or plan to upgrade to a new PC, you will need to swap disks while keeping the original configuration and software intact. Cloning software helps you take an image of the original hard disk so that after the swapping is done, the image can be used to restore the previous configuration.

Hard disk backups: Data backup is the most important task today for any individual or organisation. Data that is backed up can be referred to when some information is needed or during formatting of hard disk or a system crash. The data that is backed up is to be brought back to the original configuration of the system using the OS. The image created by the cloning software program helps in restoring the OS, which in turn can be used to recover backed-up data.

Disaster recovery: Disasters could occur due to power failures, virus attacks or various other reasons. During these times the hard disk has to be restored after formatting, and one cannot spend ages installing the OS and drivers all over again. The hard disk image stored in another partition or a CD can be used to restore the OS during disasters.

Hard disk cloning can be effectively used wherever a large number of computers are used. Corporations are often required to install a consistent and tested environment on a large number of computers. Computer labs used as a place of experimentation and exploration, run a high risk of virus attacks and crashes. Testing labs require a basic test configuration to be restored

after every test. Thus hard disk cloning makes all these tasks in different organisations both manageable and reliable.

Norton Ghost 2003 Personal Edition is one of the most popular hard disk cloning software, and comes from the makers of Norton Antivirus, Symantec Corporation. It offers fast and easy cloning recovery for both corporate and individual users. It also provides unmatched flexibility, control and features additional standalone utilities such as GDISK. The workshop that follows will show you how hard disk cloning can be done using Norton Ghost 2003.

To create or clone an Image File on a Partition:

Open Norton Ghost through program files. Click on Backup to open the backup wizard. Click Next. The wizard asks you the source of the image (the hard disk or partition whose image is to be created). Select 'File' as destination, and not 'CD/DVD'. Next, browse to the other partition where the image has to be stored and give an appropriate name to the image file. The wizard then gives you the list of devices and drivers, which cannot be restored from the image. The next wizard shows an advanced settings window where the list of external devices and drivers, such as USB or FireWire is to be mentioned for later restoration. The image can also be password-protected using this option. Just click 'Next' if you do not use any USB or FireWire devices and don't want password-protection. Now, the wizard shows you a screen to tell you the interface that is used after the computer restarts in DOS mode. Click Next, and you will get information on disaster recovery. The wizard prompts you to create a recovery disk and gives you tutorials on how to go about doing it. Create a recovery disk as per the instructions and use it in case Windows fails to boot. The next screen is the task summary showing details of the source and destination. The wizard prompts you to save all data and close all applications and then click OK. The computer restarts



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in DOS mode, an interface opens up and the image of the source is created on the destination partition or hard disk that you chose. After another restart, check your hard disk or partition for an image file (.gho extension).

You have successfully created an image of your hard disk!

Restoring Your Computer Using The Image

If you have saved the image and want to restore it, here's how to go about it:

Open Norton Ghost and click on 'Restore'. Click 'Next' in the Restore wizard. Now, the wizard asks you to select the source file—hard disk or partition where the image was originally created. Next choose the destination hard disk or partition that is to be restored. The wizard issues a warning that Windows will be rewritten. Check the box for confirmation and click next. In the next screen the wizard shows the devices and drivers that it cannot restore from the image. The Advanced settings allow you to choose external devices that are to be restored. Click 'Next' if you don't use any USB or FireWire devices. The wizard now shows the DOS interface that it will use during restoration. In the next screen the wizard displays the summary of restoration, and prompts you to save data and close all applications. Click 'OK'. Your Computer will reboot. The ghost creates a virtual partition and then reboots again. After rebooting, the restoration process takes place in the interface. The computer reboots again after the restoration process is complete. By restoring the ghost image you will be able to get your computer up and running in a matter of minutes!

On The Road To Recovery

Here's how you can go about recovering your data:

As soon as you realise your hard disk has crashed, shut down your machine to prevent any further damage to your disk. Then restart your machine, go to the BIOS and check if the hard disk is being detected. If your hard disk is not detected, you won't be able to recover data through any software. However, if the hard disk is

detected then there's a chance you can recover your data via software.

Plug in another hard disk to your computer so that the data you recover can be stored on it.

However, ensure that the second hard disk has more free space than the size of the data you need restored. If you wish, you can plug in a Zip drive as well, but make sure that the recovery software you're using supports such media.

Remember that though you might have another partition on the crashed hard disk, you can't recover data on the same hard disk. Hence, it becomes mandatory to plug in another storage medium in which data can be stored.

Make sure you have a bootable floppy disk. Insert the floppy disk and boot your machine from the floppy. After booting in DOS mode, insert the recovery software floppy diskette. We've taken the example of Easy Recovery software from Ontrack, which is considered to be one of the most effective. You can also use other software such as Stellar Phoenix Data Recovery Software, Final Data etc.

You will get an option to select the primary hard disk (the one that crashed) as the 'Recovery source' and the second hard disk as the 'Restore destination'. The software then analyses the data it has to recover from the crashed hard disk. It does this by trying to match it to the FAT Tables. The data that matches the FAT table is the data that is still visible to you, and the data that does not match the FAT table is generally the data you're trying to recover.

Once the utility finds raw data on the disk that equals a file, but finds no similar entry in the FAT Table, it marks the data as a recoverable file and adds it to the existing list of files it has. All the files that exist on the hard drive, whether in the FAT or detected by the software, are shown as recoverable files. Once this is done, you can choose what you want to recover, and it will be copied to the destination drive. The whole process might take hours to complete, depending on how much data has to be recovered.



Serial ATA: Hit or Miss?

With the upcoming ATA/133 standard pushing the limits of the maximum transfer rates supported by the Parallel ATA interface, the next step to revolutionise hard disk interfaces will be Serial ATA. It offers greater speed, easier fabrication and application.

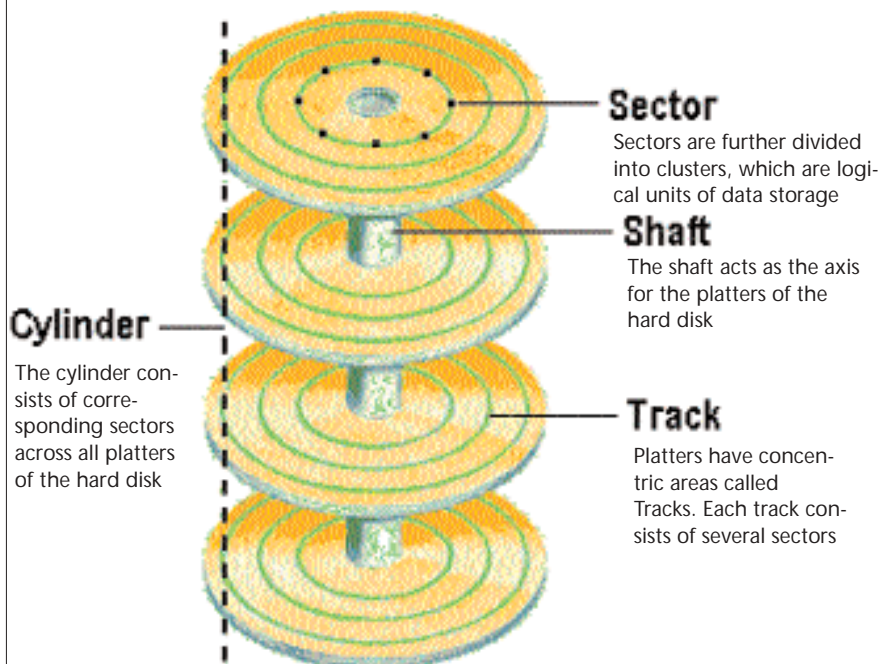
The Serial ATA interface is to ATA what FireWire is to SCSI—the entire approach is to convert the parallel standard that is used by existing ATA interfaces to a serial format (where one bit is transferred at a time) so that higher data transfer frequencies can be supported. Also, this approach greatly simplifies the fabrication of cables and connecting wires that are used by the interface, since there are fewer signals to deal with, facilitating a less cluttered cabinet.

This translates into easier airflow within the system—and, subsequently,

more efficient cooling. In fact, Serial ATA uses just four signal pins (there are a total of seven pins; the others are used for transmitting overhead commands) that actually carry the data and include the power and ground pins. This is significantly lower than the 80 lines that are used in today's ATA/100 and ATA/133 cables.

This standard will support transfer rates of up to 150 MBps. Also, since this is a point-to-point protocol, there will be no place for master and slave devices on a single cable—and bandwidth will not need to be shared between devices. Another big advantage with this standard is that it is backward-compatible with the existing parallel ATA standard at the driver level. Therefore, all existing applications that use the parallel ATA standard can be fully extended to support Serial ATA.

Under the bonnet of a Hard Disk



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The Future of Primary Storage

Emerging technology plays a big role in today's business. Peripherals like motherboards, processors and other system components are getting faster and demand much more bandwidth from internal and external interfaces. The world of hard disk manufacturers is changing and the demand for storage is also on the rise. Welcome to the next generation revolution in hard disk interface, the Serial ATA, popularly known as SATA. SATA is one such standard that will be hitting the internal interface industry with a big bang.



Seven key industries worked together to develop a working group for Serial ATA in February 2000 and named it the SATA workgroup. The promoters were: APT Technologies, Dell Computers, IBM, Intel, Maxtor Corporation, Quantum Corporation, and Seagate Technologies. Of these, Intel has been the leading player on the host side, with Maxtor taking a key role on the device side. By December 2000, there were more than 70 contributing companies covering the disciplines required to enable this technology.

Serial ATA interface helps transfer data at a speed of 150 MBps with ease and is moving on to pick up speeds of up to 300 MBps by 2005 and 600 MBps by 2010. This interface is completely different from parallel ATA interface. The serial ATA interface is a small thin cable with just a 7-

pin connector as against a normal 40- or 80-pin cable, which translates to a complete reduction in the number of jumbled up wires within the cabinet.



One such formation of eight companies, including some of the largest names in Japan's electronics industry, have formed a consortium to promote and license a new removable hard disk system for use in personal computers and consumer electronics devices.

The IVDR, or Information Versatile Disk for Removable usage consortium, was established by Canon, Fujitsu, Hitachi, Phoenix Technologies, Pioneer, Sanyo Electric, Sharp, and Victor of Japan, along with support from electronics connector maker FCI Japan and computer peripherals maker Mitsumi Electric.

IVDR disks are little more than conventional 2.5 inch hard disk drives of the type commonly found in notebook computers, and increasingly in consumer electronics products such as digital video recorders and some digital music players. To the conventional drive, the consortium members have added a new connector, better suited to such a removable system, and also a plastic case to protect the drive.

Led by Sanyo, which first considered such a system two years ago, the consortium members began discussing removable hard disk drives as a solution to an ever more common problem: as hard disk drive technology continues increasing, maximum drive capacity is roughly doubling each year which means that consumers who buy a product designed to last several years will very soon be left behind by drive technology.

As for cost, the group expects IVDR drives to retail for around 10 or 20 per cent more than a PC hard disk drive.

The highest capacity 2.5 inch hard disk drives available now, at around 60 GB, already have six times the capacity of double-sided DVD-RAM disks and exceed the capacity of the Blu-ray optical disk format. Blu-ray was proposed in February by some of the same companies, but is not expected in the stores for at least a year.



pin

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Buyer's Guide

SECONDARY STORAGE





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The humble floppy drive is as good as extinct, and the CD-ROM is treading on similar grounds, with faster and more feature-rich DVD-ROMs all set to dominate the food chain. DVDs not only promise an end to multiple-CD games and applications (and the irritant of 'disk-swapping' that invariably follows), but also bring with them the wonderful world of DVD movies—the concept of the home theatre was never a more likely proposition.

In the field of optical storage, an interesting situation has developed in the market—the prices of DVD-ROM and CD-ROM drives have plummeted dramatically. This has resulted in a situation where you can now buy a DVD-ROM or CD-RW drive for approximately the same price! Also the speeds of these optical drives are at an all-time high—DVD-ROM drives are maxing out at 16X speeds while CD-ROM drives can read data at 52X ROM speeds.

CD-Writers today can burn 700 MB of data in less than three minutes, and a rewritable CD (CD-RW) allows you to burn data more than 50 times on the same disk with reasonable reliability.

DVD-RW, which is still in a nascent stage of development, shows tremendous scope as the ideal data backup solution, with capacities ranging from 4 GB on a normal DVD-R to 23 GB on the new Blue Ray DVD disk. It will certainly take some time for the DVD-R to catch on, simply because the prices are too high right now. But make no mistake—they are the future.

Another category of storage devices are external hard drives and the cute USB Pen drives; ideal solutions for people who shuttle data to and from their home computer and office PC. The Darwinian theory is certainly holding true for Zip and Jaz drives, which are seeing a rapid downfall as CD-Rs become more

and more affordable than Zip diskettes.

So how does one decide on the ideal secondary storage device? A lot depends on what you are going to use it for. A CD-Writer forms an excellent secondary storage device because of its versatility and economy. Falling prices and easy availability make CD-R media a lucrative option when compared with any other secondary form of storage. CD-R media offers excellent data integrity and reliability, and if you back-up important data frequently, a CD-Writer is the best solution for you.

On the other hand, a DVD-Writer can hold huge amounts of data, which makes it an ideal backup and storage solution for design professionals who constantly deal with file sizes running into many gigabytes. Despite their huge capacities, DVD-Writers and DVD-R media are quite costly (and hence uneconomical), but this will certainly change as the adoption increases.

For people who can't invest in a DVD-writer—already launched by LG at a price of around Rs 25,000—but still want a high-capacity storage device, an external hard disk is an excellent proposition. With a USB interface these drives provide fairly good data transfer rates. Moreover, you can take the data wherever you go, so your work is not limited to the office PC.

On the other hand, USB Pen drives are good for moving small document files and other important data that's not more than 512 MB. But the real advantage of these solid-state storage devices is their size—they can be easily slipped into your pocket or used as keychains.

Some models like Creative MuVo and Apacer Steno offer another advantage—they can double as MP3 players. Windows XP doesn't even require you to install drivers, so operating most of these devices is child's play.

Market Overview

In optical storage, CD-ROM has gone out of focus both for buyers and resellers as CD-Writers have made inroads in a big way. The prices for CD-ROMs have plummeted to an all time low of approximately around Rs 1,000. Market sources mention that this is the lowest possible and beyond this point, the vendors would pull CD-ROMs rather than selling at a loss. Eventually in another 6 months or so, in optical drives CD-ROMs would be extinct and only DVD-ROMs and CD-Writers would be available. With prices for CD-Writ-





ers falling fast, they are virtually replacing all other secondary storage devices at the desktop level as the primary storage and backup solution. Today a 52X CD-Writer costs only around Rs 5,000. In contrast, even a year ago a 32X used to cost at least Rs 8,000. Similarly, CD-R media sold for Rs 25 to 35 a year ago, but today they cost around Rs 13 for a 700 MB disk. These drives can also read CD-RW media, which can be used up to 50 times and cost around Rs 75 each. This further reduces running costs in a big way.

All these advantages have seen CD-Writers being accepted in a big way, whether it's for data backup, moving work from office to home, or creating back-ups for all your favourite MP3s and movies. So, CD-Writers could be your best choice at the moment. The same cannot be said for external CD-Writers, since today a 48X external CD-Writer can cost as much as Rs 9,000.

These should be considered only if you really need them.

Though DVD-Writers have been touted by vendors for a year or so, they have been priced far out of reach of the average home user. Nearly all DVD-Writers are priced between Rs 27,000 and Rs 35,000, which can hardly be called affordable. Also, the price of DVD-R media can vary from Rs 90 for unbranded ones to Rs 400 for good-quality branded options. Further, there's a lot of confusion over DVD-R media formats currently available in the market.

Though this technology is far superior to CD-Writers in terms of amount of data storage and reliability, the high cost makes them affordable only to a handful of people. But it's only a matter of time for prices to fall and for DVD-Writers to become as affordable as CD-Writers, so do have the patience to wait!

USB Pen drives from popular brands like Iomega, Creative and IBM have suddenly caught the attention of buyers. These drives no longer come as just a storage device—many have integrated a full-function MP3 player into these drives. The prices for these drives vary a lot depending on the capacity of the drive and any extra frills it has. A standard 128 MB drive should cost around Rs 3,500, and the same capacity drive with an integrated MP3 players should set you back by Rs 7,500 or so. These drives can be considered as an ideal replacement for floppy drives.

Also Remember...

■ Types of media that can be used are CD-R and CD-RW. The advantage of the more expensive CD-RW media is that it is reusable.

■ If you have an older system, you may not be able to write at speeds faster than 8x, because your system is incapable of feeding the writer with data at the required rate. This is usually due to slower hard drives, low processing power and limited RAM.



Buying Tips

DVD-ROMs

- Since 16X is the fastest speed available it is advisable to go in for that.
- Please take a look at the various formats the drive can play. Most DVD players can't play all the formats. If you have a DVD-RW it may be possible it can't read that disc. In that case, a new DVD-ROM will be a bad investment.
- Also ask for the warranty period and the parts covered in the warranty.
- Make sure you buy a DVD-ROM drive which has at least a buffer memory of 512 KB.
- A slot DVD Rom will last longer than the tray one. Hence it is advisable to invest in a Slot DVD-ROM.
- Ensure that a good DVD playback software such as WinDVD is provided along with the drive.
- A DVD-ROM drive should be able to read dual-sided DVD media.

CD-Writers

- Make sure the drive has a high spin speed and low access times. Access time is more important if you need to read non-sequential data such as games.
- It should support oversizing/overburning.
- It should support TAO, DAO, Multi-Session and Incremental Packet Writing.
- It should support RAW writing.
- It should include CD-burning software.

General Checklist

- The drive's firmware should be upgradable for future support.
- Drivers for all major operating systems should be included.
- The audio and IDE cables should be included in the package.
- It should have at least a one-year warranty.

Secondary Storage

Whether you need to back up important files or transport data from one computer to another, a wide array of external storage options are available to you. From a few megabytes of data to several gigabytes, you can be sure to find a unit that suits your storage requirements, and at the same time fits your budget.

Spinning the Disc

CD-ROM drives offer data transfer speeds ranging from 2.5 MBps to 4.7 MBps for the IDE models. SCSI CD-ROM drives are available, but are not something that most mainstream users will consider.

The differences in transfer rates between CD and DVD-ROM drives are very significant. DVD drives are usually adopted by users who have easy access to DVD movies.

CD-R and CD-RWs are the choice of today for inexpensive storage options, and cost between Rs 3,000 and Rs 7,000 for most 48X to 52X drives.

Technology Insight

A CD-ROM drive consists of a laser that is mounted on an assembly that can align it with any part of the disc as it spins. This laser reads the data which is stored in the form of a pit (bit 0) and land (bit 1). DVD-ROM drives differ only by the higher density of information stored on the media.

CD-Writers are similar to regular CD-ROM drives except that they let you burn the data on blank media. The media has a compound layer which, while in a crystalline state, allows the laser beam to pass through and reflects it back from the metal layer. When in the amorphous state it doesn't allow reflection of light. This describes the 1 and 0 states of information storage. The laser beam is powerful enough to change the state of the dye in the medium used for writing.

Smart Tips

Capacity: This really depends on your application, or the quantity of data you need to back up. There is no real need to go overboard on storage capacity, as the cost of such media and devices are quite steep.

Speed: Random access media such as hard drives, CD flavours

and cartridges have the advantage of quick access to data stored on the media. If you have larger data backup requirements then opt for a drive with higher speed to save time.

Portability: If you share your data with others, it makes sense to consider options that are in widespread use. Iomega's Zip drives, for example, are quite popular. The other options are the newer Flash-memory-based drives that utilise the USB port on any PC and make data portability even simpler.

Build quality: Some cheaper drives have very fragile loading and unloading trays. This tends to fail over a period of time. Look for a drive with a sturdy mechanism.

Durability: Media that is enclosed in a case will withstand the test of time better than exposed media. CD-ROM discs, which are the most popular means of data storage nowadays, are highly susceptible to scratches—which could render them useless.

Interface: IDE is the least expensive and most popular option. SCSI models require an additional SCSI card to be installed, but result in lower CPU utilisation. External models tend to use the USB interface.



Jargon Buster

Back-up: The essential job of saving and storing data on a tape or other storage device, such as a CD-ROM, outside your computer hard disk or computer network.

Copy Protection: Both discs and players come equipped with hardware mechanisms to prevent the illegal copying of DVDs. You will not be able to copy the movie to a VHS tape, your computer's hard drive or any other data-recording device.

DAT: Digital Audio Tape (DAT) is a compact, high capacity form of data storage, suitable for archiving or backing up large amounts of data.

DVD: DVD (digital versatile disk) is a high-density format for playing full motion video. It provides vast data storage capacity. Although popular within the home market, DVDs can also be used to hold computer data.

Decision Maker

	Inexpensive backup	Fast backup	Portability and space	Entertainment enthusiast
You Need	Speed is not an issue; you are just looking for a cheap, reliable backup solution	Speed is everything, and you have no intention of spending more than 5 or 6 minutes to burn a CD.	Speed becomes a concern as well. Price is not a problem.	To watch high quality movies as well as have the regular CD-ROM functionality
Look For	32X, 48X CD-ROM	A 52X CD-Writer	A drive that can store approximately 1 to 2 GB of data on a single disc; SCSI or FireWire connectivity.	Look for a DVD-ROM that is rated at 16X or better.
Our Pick	Samsung, LG or Liteon	Liteon LTR55246S, MSI CD-RW CR52-A2	Iomega Jaz drive, Castlewood ORB drives	LITEON 16X DVD Drive, Pioneer 16X DVD Drive
Price Range	Rs 3,000 to 3,500	Less than Rs 5,500	Rs 17,000 to Rs 28,000	Rs 2,000 to Rs 5,000

Power Tips for Maximising CD-Writer Performance



- Enable ASPI (Advanced SCSI Protocol Interface). ASPI drivers mainly consist of these four files: apix.vxd, apium.vxd, winaspi.dll, and wnaspi32.dll. They allow the CD-Writing software to access the hardware.
- Keep your hard drive in top condition by regularly running disk tools like Scandisk and Disk Defragmenter.
- Disable programs running in the background (screensavers, alerts, anti-virus programs, etc) to free up system resources.
- Shut down all other applications while burning CDs; do not use the computer for any other tasks while a CD is burning.
- For a CD-to-CD copy, always create an image before writing.
- Keep the firmware versions up to date. Check the manufacturer's Web site for latest updates.
- If you use an ATAPI (IDE) CD-RW drive, make sure it's on a different IDE channel than the hard drive. PCs come with at least two IDE channels (primary and secondary) built into the motherboard. Each channel supports two IDE devices on a single cable: a master and a slave. Hard drives should always be on the primary channel, and ATAPI devices (if any) should be on the secondary channel. Preferably keep your CD-Writer as the secondary master device.
- Disable auto insert notification from *Start > Setting > Control Panel > System > Device Manager > CD ROM > Device Name > Settings*.
- Windows 98 users can increase the disk cache for frequently used hard-disk data. Select *Start > Settings > Control Panel*,

double-click the System icon, choose the Performance tab, select File System, click the Hard Disk tab, and under 'Typical role of this computer', change 'Desktop computer' to 'Network server'.

- If you need to burn a CD while you are still on the network, disable 'File and Print Sharing' under Network Properties, to prevent other users from accessing your hard drive.
- Enable DMA from *Start > Setting > Control Panel > System > Device Manager > CD ROM > Device Name > Setting > DMA*. This helps the device to directly talk to the hard drive rather than going through the CPU and then accessing the drive.
- If you have a fast CD-Writer but a slow processor and hard disk subsystem (ATA 33), it is safer to burn the CD at a speed lower than the maximum possible.
- Use Track-At-Once instead of Disk-At-Once to burn an Audio CD. This will make the Audio CD look more professional because a 2 second gap will be inserted between each burned track and the CD can then be mass produced error-free.
- Always finalise a burned Audio CD to ensure that it plays on your home music system.
- Use branded CDs for burning critical data—cheaper media are prone to damage and can't hold data for long.
- Try to simulate a burn process if the CD-Writer has just presented you with a coaster. Most CD-Writing software will allow this.

Workshop: Using CD-Writers

How to Make a Bootable CD using Nero

Step 1: Get a bootable CD or a bootable floppy of the operating system to make the new bootable CD.

Step 2: Start Nero and select the CD-ROM (boot) in the main window. You will be greeted with a new window with an option where you can select the drive in which the bootable floppy/CD is located. Here, make sure the bootable media is in the drive, otherwise the drive letter will not be highlighted.



Step 3: Put the blank media in the CD-Writer and leave the ISO and Misc tab as it is. Give the appropriate name in the label section for the bootable CD. Select the

Burn tab and check the write and Finalize the CD. Select the Disc-at-Once write method and click on the New tab.

Step 4: Since the bootable CD will be left with lots of unused space, it can be utilised to burn drivers and updates for your PC.

Step 5: Select the Write tab and in the window which opens, select the safe writing speed according to the configuration of your machine.

Step 6: Now you are ready to write the CD. The typical size of the bootable CD for windows 98SE should come to around 125 MB and it will take around 4 to 5 minutes to complete the process.

Step 7: Check by booting the system with the CD you burned.

Make Music CDs using Nero

You can also burn CDs using Nero Burning ROM

Step 1: Click on *Start > Programs > Ahead Nero > Nero Burning ROM*.

Step 2: Select the Audio CD option and click on the Next button.

Step 3: Use the Finish button to confirm all the details.

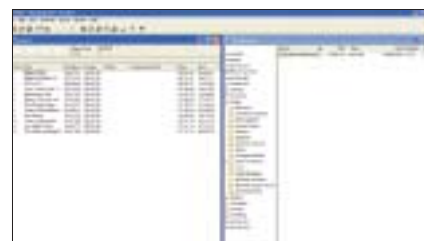
Step 4: Select the songs you wish to save on the CD from the File Browser on the right side of the screen. Drag them to the Compilation window on the left by holding down the left button on your mouse.

Step 5: Once you have dragged all the files across, you are ready to save (or 'burn') to a CD. Go to *File > Write CD...* option to launch the Burn CD Wizard.

Step 6: Click the Burn button to start writing process.

Step 7: Once your CD has been written, click the Discard button. You can now retrieve your recorded CD from the drive.

Note: After the burning process is over. To exit from Nero, select *File > Exit* from the menu bar. Now you will be greeted with a window asking you to save the session. Click the No button.



Software Bundles and Package Contents

What is a CD-Writer without CD-Writing software—or with software that can't do half of what the CD-Writer promises? CDs often get damaged due to problems with the writing software rather than the CD-Writer—its inability to properly recognise the writer or the operating system's file system and/or other intricacies.

Also, support for the wide array of formats is critical. Providing the best compatibility when it comes to operating systems and the ability to recognise a wide variety of CD-Writers is critical. Some software like Nero and Easy CD Creator have made a name for themselves in this arena.

The contents of the package are also a measure of the total value offered by the company. Since no software comes for free, getting high-quality software bundled with the CD-Writer is definitely an advantage.

Nero Burning ROM: This is probably the most popular CD-Writing software. The latest version now comes equipped with speed selection for erasing the CD-RW media. Another new feature that attracts immediate attention is the CD cover designer. Backing up your hard disk is also made easy.

The Wave Editor tool extends the functionality of the software by allowing you to load and edit music files. Reducing noise in tracks, increasing volume and giving other such effects is now not only possible, but easy as well. This version has features even for Mac users. It has support for Hybrid CD and HFS partition. You also have an integrated tool that adds support for virus scanning over the Internet.

The latest version of Nero has two additional diagnostic tools, Nero CD Speed and Nero Drive Speed. The installation

size is not very big and this is without doubt the most easy-to-use CD-Writing software. The popularity of this software among top CD-Writer manufacturers is reason enough for it to be the most widely recommended CD-Writing software suite.

Verdict: Nero has probably the best wizards designed for CD writing, making the whole process very simple. It also has a really large CD-Writer database, ensuring high compatibility.

NTI Professional: NTI professional has an interface that appears similar to Nero's. It comes bundled with a simple CD label creator. Apart from supporting normal CD creating modes, it has a very interesting feature—Live Audio Writing, which allows voice recording directly on to

a CD. NTI also has a built-in ISO and file comparing tool. Another



DVD Region Locking

As a part of DVD technology licensing arrangements, the world has been divided into six geographic regions. This means that movies from Region 1 (USA and Canada) will not play on a DVD player designated for regions 2 to 6. Effectively, Region 1 discs play only on Region 1 DVD players, Region 2 discs play only on Region 2 DVD players and so on.

A region code is embedded in the DVD-ROM drive. The first DVD disc inserted into a drive sets the region code for the drive. The drive's region can be changed four more times before it is permanently locked to a region. Inserting a disc that has a different region code than the drive's current code makes these changes.

Maintenance Tips

The drive

Do's: Your CD or DVD-ROM drives is probably the most used peripheral, when it comes to playing games, movies, songs or installing any software. In order to extend the life of your CD-ROM, one should use a lens cleaner at least once a month which is freely available in the market to clean the lens of the CD/DVD-ROM drive.

Don'ts: One common mistake that usually everyone does is closing the disc-loading tray by manually pushing it by the hand resulting in misalignment of the tray due to the extra force exerted by the human hand. It is recommended to close the tray by pressing the button from the panel thereby avoiding any sort of misalignments.



The Media

Do's:

■ The media, that is the CD-ROM is supposed to be long lasting however very often one finds that they fail to do so due to mishandling. The media should always be kept in a jewel case so that it remains free from dust and scratches.

■ If you find dust settled on the media then you should clean it with a soft clean cloth to prevent scratches, as the drive will take longer time in reading the dirty media or it may even fail to read it completely.

■ Always hold the media from the edges.

■ Always clean the media from the centre to the outer portion.

Don'ts:

■ The media should not be exposed to direct sunlight as it may damage the CD-Rom.

■ Never clean the media in circular motion.

■ Make sure you there are no fingerprints on the Media.



er advantage is that it is very light on the system.

Verdict: *NTI Professional detects all major CD Writers and is easy to use, but it doesn't offer any outstanding features.*

Easy CD Creator 5 Platinum: This is a big software as far as install size is concerned—but it's worth it, given the extensive feature list. The software sports one of the neatest interfaces, making it easy to access different features. Access to the submenu is through the main menu, and it's very difficult to make mistakes. The software comes bundled with Direct CD, which allows you to drag-and-drop files from Windows Explorer. To increase audio and video quality, Easy CD has built-in filtering software.

Creating an audio or video CD takes just one click. Copying a CD using the CD Copier option is an easy task. Those who regularly take backups on CDs will be pleased with Take Two backup tool, which takes backups and even looks for updates on your drive. Like other CD burning software, Easy CD Creator has an online Web Check Tool and a CD label creator.

Verdict: *This is one of the best designed and most feature-rich CD burning software available.*

Prassi PrimoCD Plus: This one has a relatively simple interface. The software takes very little time to install—it has an install size of just 2.23 MB and no memory-hogging tray icons. Instead, it has very small buttons that take just a few attempts to get used to.

Burning a data/audio/video CD is very easy as there are buttons for them on the main interface. This speeds up the process by eliminating scrolling time. A box at the bottom displays appropriate messages to guide the user.

Is my CD-Writer too Fast for my PC?

CD-Writer speeds now touch 52X but is your system capable of sustaining those data transfer rates? Does buying a fast CD-Writer make sense when you have a slow performing system? Well, don't be fooled into upgrading just because you bought a fast CD-Writer. For your 'fast' CD-Writer to give you optimal performance, it is sufficient to have a PC with a 500 MHz processor with 128 MB RAM (256 MB recommended). Though the data transfer rate to the writer is fast, it is still much lower than the data throughput a hard drive can achieve. Hence, any 5,400-rpm hard drive should suffice.

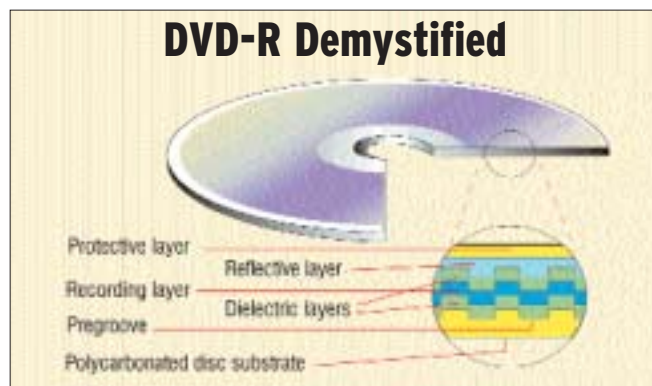
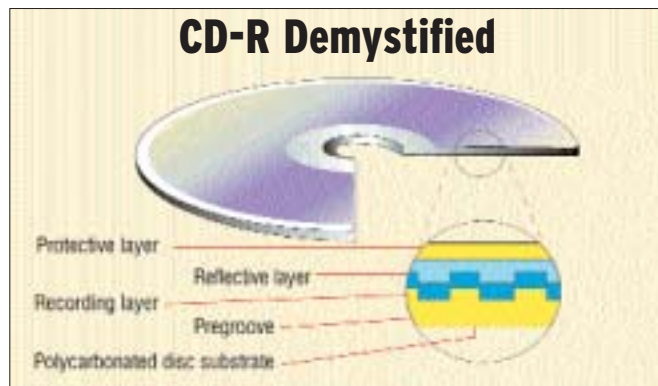
Clicking on the graphical representation of the media in the recorder brings up Disk Explorer and the Properties menu, displaying information regarding the media. It also has a step-by-step help file in HTML format.

There's a list of supported formats and a comprehensive error message list. The software has good support on the Net and is a good choice for those looking for a stable and hassle-free CD writing software.

Verdict: *This is a well-developed CD burning software but the interface could do with a facelift.*

Taking Care of Your Optical Drive

- Never use poor quality detergents and sprays for cleaning. Clean the drives using a soft, dry fabric.
- Keep the tray clean. Use a duster for thorough cleaning.
- Use a UPS (Uninterrupted Power Supply) for your computer and the Writer. This will protect your system from any surge or dip in power.
- Do not push the tray to close it; always use the eject button instead.
- Never try to force the tray out, if it doesn't eject automatically. Use the pin provided with the drive to manually remove the tray.
- Use a good quality lens cleaner to keep the lens clean, as this is one of the most important parts of the drive.



The Future of Storage Devices

Secondary storage devices have evolved a great deal from the slow, cumbersome and low-capacity floppy drives to the latest DVD-Writers capable of storing gigabytes of data. The future seems very bright, with new inventions and newer standards being formed to cope with the growing storage needs on multiple platforms.

CD-Writers have theoretically reached a saturation point from where further upgrading seems impossible. Many vendors like Plextor have invented new ways of crunching more data into a normal 700 MB disk but they are plagued with incompatibility issues with existing CD-ROM drives, which are incapable of reading such 'oversized' disks.

On the other hand, DVD-Writers are still in a nascent stage and hence more promising than other devices. Currently available DVD-R can store about 4 GB of data, but the newer Blue Ray disks—which have just appeared on store shelves—can store a mammoth 23 GB data on a single disk.

Burn-Proof Technology

Buffer underruns occur when the computer fails to provide data to the CD-Writer in a continuous stream. As a result, the record-

ing fails and the media becomes unusable. This can happen when attempting to burn a CD-R while performing other tasks, or when recording from a relatively 'slow' source to a 'fast' target.

In the past, you needed to shut down all the other activities running on your PC and wait till the CD-Writer finished writing the CD. With the advent of Burn-Proof technology, you no longer need to continuously monitor the buffer bar. Introduced by Sanyo, CD-Writers featuring this technology have become intelligent enough to synchronise, wait and then burn the data.

Using this technology, recording is paused at a specific location when an impending buffer-underrun condition is detected. The writing process resumes only when the buffer has been sufficiently replenished and after repositioning the CD-Writer's optical pickup mechanism to the appropriate sector.

Most major drive manufactures either license similar technology or have developed their own variants. Mitsumi and LG Electronics use OAK Technology's ExaLink system, Yamaha does the same but under the brand name SafeBurn. Acer Communications refers to their technology as Seamless Link and Ricoh calls theirs JustLink.



External v/s Internal Writers

Choosing between an external and an internal drive depends primarily on your requirements.

- Internal drives are usually cheaper. You can choose these if you are a home user and not always on the move.
- Till now external writers were slower compared to internal writers due to their interface but with the arrival of FireWire and USB 2.0, this is no longer a problem. Drives based on the SCSI interface were traditionally the fastest.
- The greatest advantage of an external USB CD-Writer is that it can be hot-plugged to the PC (that is, there's no need to shut down and restart).
- External writers come with the added baggage of SCSI/FireWire/USB 2.0 cards, which adds to the budget.
- Internal CD-Writers tend to hog a great deal more of the system's resources.
- Buffer underruns used to be a big problem with internal drives, but that's been solved with the advent of buffer underrun protection technology.

Hybrid DVDs

Nine leading consumer electronics manufacturers have jointly established the basic specifications for a next-generation large-capacity optical disk video recording format called Blue Ray. These DVDs can hold six times as much data as current standard disks. The new format can store more than 13 hours of film, compared with the current limit of 133 minutes.

High Density-DVD is an enhanced form of current DVD format. Blue lasers have a much shorter wavelength than the red lasers used in current DVD players, allowing for much greater disk capacity. The new high definition format allows a capacity of 4.7-15 GB on a single-sided, single-layered disk, and a capacity of 8.5-30 GB on a single-sided, double-layered disk. Some feel this is a cost-effective upgrade path for media vendors—and a backward-compatible solution for those who've already built DVD libraries.

Current DVD players use 650 nanometre (nm) red lasers, while CD players use 780 nm diodes. It won't be possible to play Blue Ray disks with existing DVD and CD players, since these don't contain 405 nm lasers. Blue Ray drives will need to contain 780, 650 and 405 nm lasers in order to be compatible with CD and DVD disks.

Buyer's Guide

INPUT DEVICES



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In the good old days of the clickety-clack typewriter, nobody gave the keyboard a second glance. It came with the equipment, and that was about it. The arrival of the personal computer changed things drastically. So much so that even the 101-key keyboard is now passé. Newer multimedia keyboards sport as many as 22 hotkeys, and boast of aesthetic and ergonomic designs. They can cost as much as Rs 12,000, but you can pick up a regular keyboard for as little as Rs 300.

Important factors to be considered before purchasing a new keyboard include the comfort it gives you while typing, the layout of the keys on the device, tactile feedback, the presence or absence of a palm rest or wrist support, the number of hotkeys available, integrated trackballs and other mouse controls, the interface (USB or PS/2), and of course, overall build quality.

The popular brands in the market are Microsoft, Logitech, Samsung, Acer, Typhoon, Odyssey, Frontech, Gigabyte, Neotech, Vesta and Mercury. Prices begin

at a humble Rs 300 and touch the sky at Rs 5,000, so it all depends on the brand and the type. For instance, a wireless RF (Radio Frequency) keyboard could cost over Rs 4,500. A keyboard with a PS/2 interface, on the other hand, starts at just Rs 300.

Keyboards from Typhoon, Frontech and Neotech also have a built-in microphone, along with multimedia functional keys. Look for keyboards that accommodate extra function keys for increased productivity—for surfing the Internet,

running a CD audio player or opening the mailbox. However, these keyboards rely on software to run the different programs, and work with only certain operating systems.

Cordless keyboards are also available, but at higher prices. These keyboards come with an incorporated touchpad (something that works like a mouse), saving a lot of space. If you consider an infrared keyboard, check for the type of battery the keyboard uses, as well as the average battery life. Further, these devices work only along the line of sight, which may be problematic for some users.

For users who are paranoid about security, there are identification keyboards with fingerprint verification. These allow you to lock and unlock your computer with a mere touch of your finger. However, they may be difficult to find in the market.

Keyboards come in different layouts—typing keys are generally laid out in the same style that was common for typewriters. Critics of the QWERTY layout (taken from the letters on the first line of the said keyboard) have adopted another layout, called Dvorak, which places the most commonly used letters in a more convenient arrangement. However, these may be difficult to use for people used to working on QWERTY keyboards.

AT-connector keyboards are sought after by users with older motherboards. You can find this keyboard with a PS/2 converter with a few vendors. This interface, anyway, does not apply to new computers.

As far as mice are concerned, critical factors that should be taken into account include the accuracy they provide in



Buying Tips for Keyboards

- The keyboard needs to be soft and smooth
- Leg pegs on the keyboard should be sturdy; most tend to break with the slightest of jerks.
- The keys should be tactile and not require too much pressure to register. Since it's in constant use, any glitch with the keyboard can be very irritating.
- An ergonomic keyboard is split in the middle, offsetting the keys where the two hands lie. This type of keyboard does take some time to get used to, especially since the arrow keys have been completely changed.
- Many vendors offer a combination of a keyboard and mouse in a cheap package deal. This is worth exploring.
- At the minimum, any Windows user should opt for a keyboard with a Windows shortcut key.
- Try to fit in a wrist pad that provides additional comfort and causes less strain on your wrists.



gaming and image editing, the degree of symmetry that they afford—making things easy for both right-handed and left-handed people—both on a surface and with the palm. The placement of buttons and design aspects, the quality and stability of the buttons, and the length of the cable are other critical features. Optical mice are fairly common these days, and are preferred over ball mice. In terms of interface, those that plug into the USB port should be chosen instead of PS/2 mice.

Current market analysis shows that the two-button scroll mouse is still selling more than any other type of mouse. Of late, optical mice from vendors such as Mercury and The Best can be bought for anywhere between Rs 700 and Rs 1,000. They are thus becoming more affordable, but mass acceptance is still another price-cut away, especially when a normal ball mouse can be had for less than Rs 400. The professional user would of course like the reduced hassle and the greater accuracy afforded by these optical devices.

A keyboard and mouse combination is meant to be a one-stop solution for discerning and wallet-heavy users. These bundles are

ergonomic, good to look at, and fall within the price bracket of Rs 3,500 to Rs 6,500. Some of these boards—such as Logitech's Freedom Optical—aim to offer a complete solution: in this case, a wireless, optical one.

Joysticks form an important component in the buying list of any avid gamer. The Indian market has some of the best joysticks in the world. A glut of low-priced sticks storms the arena every few months, and then vanishes off the shelf at the same speed. Major players are Microsoft and Logitech, with awesome technologies and prices to match. Companies such as Saitek, Frontech and Typhoon provide a price to performance advantage.

Features that make a difference between good and bad joysticks are force feedback, number of axes, the presence of a hat-switch, a push throttle and the number of programmable buttons. Comfort is also of paramount importance when judging the usability of a joystick.

As far as the button quality is concerned, consider the play the button offers—the less the play, the more sturdy it is. For overall finish, look for panel gaps and squeaking sounds that are usually present in a bad quality product. In terms of interface, USB joysticks should always be preferred over ones that plug into the gameport. However, make sure your PC has a free USB port before you buy one.

AD

Power Tips

- Adjust the height of the chair until your forearms are parallel to the keyboard when typing, and your wrists are in a neutral position.
- Ensure your eyes are at the same height as the top of the monitor.
- Keep the keyboard and mouse close to you to avoid stretching to reach these devices.
- Leave space in front of the keyboard for you to rest your hands when you are not using the keyboard.
- Keep the screen and keyboard in a position that's best suited for your task. They could be directly in front of you or slightly to one side.
- Maintain a good posture when working at the keyboard. You can avoid back pain by using a chair that offers back support.
- Keep your shoulders relaxed, with your elbows close to your sides, when working.
- Avoid resting your elbows on the hard sur-



face or edge of your table.

- Pads can be used to protect your elbows if necessary.
- Avoid hitting the keys on the keyboard with excessive force.
- Avoid holding the mouse tightly.
- Take frequent breaks from typing.
- When typing, keep hands relaxed and fingers gently curved. Your hands should 'float' easily above the keyboard.
- Allow wrists to rest on a wrist pad during preparation for next entry, not when typing. Avoid extended wrist positions.
- Try a different keyboard, mice and trackball. There are many designs available in the market and you should find one that works best for you. If you find a mouse uncomfortable, you could try switching to a trackball.

Input Devices

Input devices consist of keyboards, joysticks and mice. The market is full of a wide variety of products, and deciding which one is right for you can be confusing.

You can buy a cheap, no-frills keyboard that is sturdy, and does the job at a rock-bottom price of Rs 300. There are several kinds to choose from, including regular 104-key PS/2 keyboards and newer cordless models that use radio waves or infrared rays to communicate with the computer. Due to their increasing popularity, these are now available in a price range of Rs 1,500 to Rs 1,800.

Mice, like keyboards, have so many options that it is hard to choose one—from simple scroll mice to optical, infrared, multiple-buttoned beauties that will leave you drooling. The prices range from Rs 300 to several thousand rupees.

The three primary types of game controllers—wheels, joysticks and game pads—are individually suited to a certain game genres. A joystick is the ideal controller for flight simulators, while game pads and wheels are better suited for driving games. However, most first-person action games are still best played with a combination of a keyboard and mouse. Microsoft and Logitech might be the big boys, but a lot of other smaller brands such as JS Equipments have solid, reliable units as well. An exciting feature found in high-end devices is force feedback—this adds considerable realism to game playing in arcade, driving and flight simulation games.

Technology Insight

The flat QWERTY layout is the most popular, but some people prefer more ergonomic models. The Natural and split keyboards from Microsoft are examples of these.

Most mice use a roller-ball mechanism to track horizontal and vertical movement. Some mice use an optical motion tracking system instead of the ball. These use a beam of light reflected off the work surface to track movement.

Smart Tips

Ergonomics (and Weight): For any input device, the most important factor is the way it feels. This is a combination of the weight, balance and the placement of buttons. A badly designed device can cause discomfort and, in some cases, even Tendonitis.

Useless features: Quality comes before quantity. Before being overwhelmed by the number of buttons or features, see that the device fits your needs, and is comfortable.

Configuration and Drivers: While a lot of these devices will work with the generic drivers supplied with Windows, device-specific drivers will allow you to calibrate and optimise your device's performance.

Connector: USB devices are becoming increasingly popular. They are easy to install and have better reaction times.

Efficiency: Scroll wheels, hotkeys, hat switches, throttle controls, etc., are all nifty little add-ons to these devices that will make using them a snap.

Decision Maker

	Keyboards		Mice		Game Controllers	
	Low budget	No budget	Low budget	No budget	Low budget	No budget
You need	A cheap and long lasting solution	The ultimate in comfort and good looks	A cheap yet comfortable mouse	Extreme precision and supreme comfort	A satisfactory gaming experience at minimal cost	A joystick that lets you feel the action
Look for	104 keys, membrane type, PS/2 interface	Ergonomic, a PS/2 or USB interface, palm rest, hot keys	Scroll mouse with PS/2 interface, preferably optical	Optical scroll mouse, extra programmable buttons, PS/2, USB	Two axis, 4 button, with a Gameport or USB interface	Three axis, 8 button, force feedback, with a USB interface
Our pick	Samsung SEM-DT35N	Microsoft Multimedia Keyboard	Benq M100 Optical Mouse	Logitech MX500 Optical Mouse	Typhoon 3D Joystick	Microsoft Side Winder Force Feedback 2
Price range	Upto Rs 300	Upto Rs 1,300	Upto Rs 700	Upto Rs 5,000	Upto Rs 1,000	Upto Rs 8,000

Power Tips for Keyboards

The keyboard is an integral part of your computer, so care must be exercised when using it. Here are some tips for basic keyboard care, as well as some common problems and possible solutions.

Dirty Keyboard

Keyboards should be cleaned regularly with a cleaning solution and a cloth or tissue. Ensure that the computer is not powered up while cleaning the keyboard. You could also use a vacuum cleaner to suck or blow air into the keyboard to clean it.

Accidental liquid spillage

If you spill any liquid on the keyboard, turn it upside down immediately. Drain all the water out, shaking it if necessary. If you've spilled water into the keyboard, let it dry before you attempt to use it. Don't plug a wet keyboard into your PC as you may end up damaging the electrical circuitry. If the keyboard still doesn't work, you may have to replace it.

'Keyboard Not Found' error

This generally happens if your keyboard is not plugged into the computer properly. Unplug it, plug it back in and the problem should go away.

Wrong installation

Many mice and keyboards today use a PS/2 connector. If you plugged your keyboard into the mouse port (or vice versa), shut down the computer and plug the keyboard into the keyboard port. The keyboard port is usually marked with a 'keyboard' symbol or is colour-coded to help you identify it.

PC does not take input from keyboard

Check if the keyboard is connected to the computer. Ensure that it's plugged into the keyboard port and not the mouse port. If the keyboard was unplugged, plug it back in and reboot the computer. If the keyboard still doesn't work on boot-up, power down the computer and borrow a working keyboard for troubleshooting. Plug the new keyboard in and boot up the computer. If the new keyboard works, the old keyboard is faulty and needs to be replaced. If the good keyboard doesn't work, check your BIOS to make sure it recognises the keyboard. It should say "installed". If the BIOS recognises the keyboard, the keyboard port may be faulty.



Stuck keys

If a key does not work, or is stuck in the down position, you may try to remove it with a pointed tool, such as a pin. Once you've pulled out the stuck key, you can try to stretch the spring to reanimate its action.

Some keys don't work

Check to see if there are any obstructions to the keys. If other keys work, your keyboard is faulty and needs to be replaced.

Don'ts:

- ✗ Do not use alcohol, solvent or anything that could remove the lettering on the keys or melt the plastic.
- ✗ Avoid spilling anything on the keyboard as the liquid may seep inside and make certain keys—or even the whole keyboard—non-functional.

Mouse Maintenance

If your mouse seems sluggish or extremely difficult to move, then it's time to clean it.

- First turn off the PC. Once it's powered down, unplug the mouse.
- Turn the mouse over. You would see a 'locking ring' that holds the mouse ball in place. This should have arrows indicating the proper direction to turn the ring to unlock it. You may have to press gently while you turn the ring.
- Once you unlock the ring with a twist, the mouse ball can be taken out.

- Moisten a tissue with cologne or any mild cleaning solution, then hold the mouse ball and clean it with a gentle rubbing motion. If the tissue gets dirty, use

another one.

- You will notice rollers inside the mouse. After you have cleaned it just wipe it with the cleaning solution with the help of the cotton swabs. It will be obvious when the rollers are clean. Now all you have to do is give the mouse a few minutes to dry completely.
- Lastly, put the mouse back together. Once you are sure it is dry, plug it back in and turn the PC on.

Don'ts:

- ✗ Never use your nails or any other sharp device to clean the inside of the mouse, as it may damage the internal components.

Troubleshooting Joysticks

Make sure your joystick is connected properly

Some joystick connectors fit loosely into the interface and will become dislodged if the cable is pulled even a little. Check the connection first to make sure your problems are not being caused by a dislodged connector. First, shut down your computer. Make sure the joystick connector is firmly connected to the correct port. When you have finished checking the connector, reboot your machine.

Enable joystick control in your game

Games will often assume that you want to use a joystick. If you want joystick control in your games, make sure it's enabled. Many games will give you an option to select joystick, keyboard or mouse. Check your game's documentation to see how to enable joystick control.

Be sure only one joystick port is active on your system

No more than one joystick port can be active on your system at one time. If you happen to have more than one port active, your joystick will not function properly. You may encounter this situation if you have recently purchased a dedicated game card, recently upgraded your sound card, or if your joystick is plugged into a dedicated I/O controller.

Check to see that you have the correct driver installed

Sometimes problems can arise if the wrong joystick driver is loaded. Check the driver in Windows Control Panel to make sure the correct one is installed.

Calibrate in Windows Control Panel

Open **Game Controllers** in the Control Panel. Under **Installed game controllers**, click the controller you want to calibrate, and then click **Properties**. Here, on the **Settings** tab, click **Calibrate**, and then follow the instructions on your screen.

Testing a game controller

Again, open **Game Controllers** in Control Panel, and under **Installed game controllers**, click the controller you want to test, and then click **Properties**. On the **Test** tab, test your controller by moving or pressing each control, including the stick, wheel, yoke, pads and buttons. After performing each of these actions with the controller, view the results on the **Test** tab.

Other Possibilities

Make sure the proper game port driver for your sound card or graphics card is installed

Check your sound card and graphics card documentation to make sure you have the correct driver installed. Having the wrong driver will result in your joystick not working properly. You can usually find the game port driver under 'sound, video and game controllers' in the Device Manager.

Power management

Joystick calibration relies on timing. If the CPU speed of a system changes, so does the joystick calibration. Sometimes power management will activate and change the CPU speed to conserve power. This may cause the joystick to behave erratically. You may want to try disabling power management temporarily to see if this is causing the problem.

Older sound cards, I/O cards, speed-fixed game cards

If you have an older game card, sound card or I/O card, you may want to

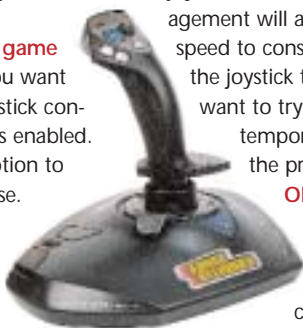
upgrade to a dedicated, speed-adjustable game controller. The joystick ports on older game controllers can't handle the speed and timing requirements of newer games. Such joystick ports, which were designed for a slower system, may cause problems on faster PCs.

Recently upgraded to a faster CPU

If you upgraded your CPU, you may have some timing issues. You may want to check your motherboard manual and make sure the system settings in CMOS are recommended for your CPU by the motherboard manufacturer.

Resolving USB controller installation issues

In Device Manager, USB game controllers are listed under Human Interface devices (in the 'Devices by type' view). If the controller does not appear in Device Manager, USB may not be enabled in the BIOS. When you are prompted as you start your computer, enter BIOS setup, and enable USB. However, if USB is enabled in BIOS but the USB host controller does not appear in Device Manager (under Universal Serial Bus controllers), or a yellow warning icon appears next to the host controller name, you may need to get current drivers for the motherboard. Contact your computer vendor and obtain the latest version. If the controller does appear in Device Manager, right-click the controller name and then Properties. Problems and suggested actions are displayed under Device Status.



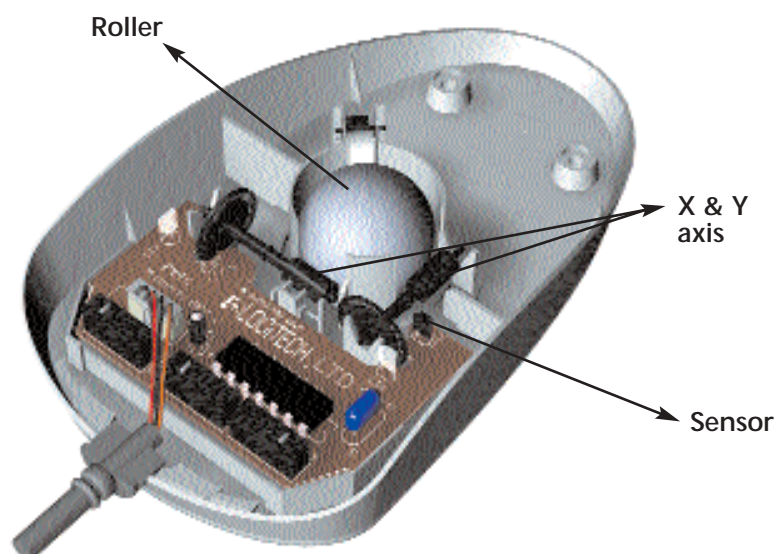
Universally applicable keyboard commands

- [Left arrow] moves to the previous letter
- [Right arrow] moves to the next letter
- [Ctrl] + [Left arrow] moves to the previous word
- [Ctrl] + [Right arrow] moves to the next word on the right
- [Home] moves to the beginning of the current line
- [End] moves to the end of the current line
- [Ctrl] + [Down arrow] moves down one paragraph
- [Ctrl] + [Up arrow] moves up one paragraph
- [Page Down] moves the cursor down one page
- [Page Up] moves the cursor up one page
- [Shift] + [Right arrow] selects the letter to the right
- [Shift] + [Left arrow] selects the letter to the left
- [Ctrl] + [Shift] + [Right arrow] selects the word to the right
- [Ctrl] + [Shift] + [Left arrow] selects the word to the left
- [Shift] + [Down arrow] selects the entire line on which the cursor is positioned. If you continue to hold down the [Shift] key and

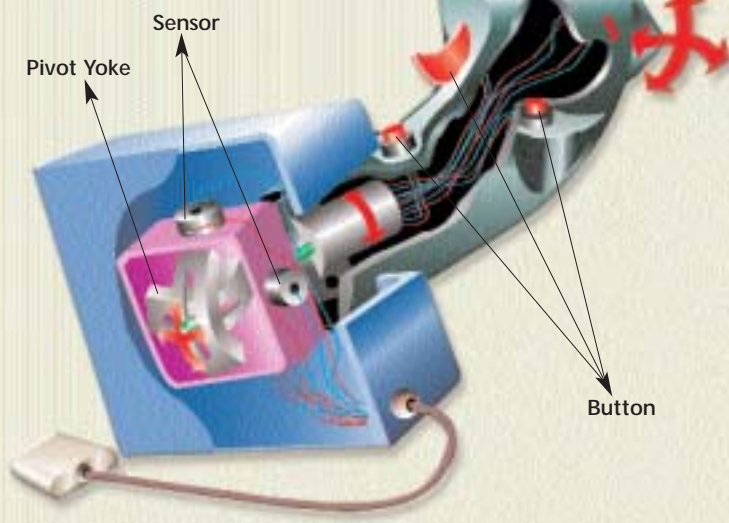
repeatedly press the down arrow, you will select multiple lines in descending order

- [Shift] + [Up arrow] selects the line above the one on which the cursor is positioned and if you hold down the [Shift] key as you continue to press the up arrow, you will select multiple lines in ascending order
 - [Shift] + [Page Down] selects the contents of the entire page beginning with the area following the point of the cursor
 - [Shift] + [Page Up] selects the page text beginning with the area immediately to the left of the cursor
 - [Ctrl] + [Shift] + [End] selects all the text from the point of the cursor to the end of the document
 - [Ctrl] + [Shift] + [Home] selects all the text to the left of the cursor to the beginning of the document
 - If you want to select one line and remove it completely, use [Shift] + [Down arrow] to select, and then simply press the delete key.
- Having selected the text you wish to work with, use the following commands to place the text in the clipboard.
- [Ctrl] + [A] is select all
 - [Ctrl] + [C] is copy
 - [Ctrl] + [X] is cut
 - [Ctrl] + [V] is paste

Under the bonnet of a Mouse



Under the bonnet of a Joystick



Buying Tips: Joysticks

■ Joysticks are ideal for playing flight simulators and space combat games, so if you are a great fan of these don't settle for a game pad.

■ Joysticks are available in many flavours, but ideally they should have a hat-switch, a throttle control and at least six programmable buttons.

■ Before you buy a joystick, check out the ball joint to ensure its durability. Do this by holding the broomstick and moving it sideways—if the motion is jerky or sticky,

don't buy it.

■ Before you zero in on a joystick, hold it to see whether your palm and fingers feel comfortable, and your fingers reach the buttons without extending them.

■ Always buy a stick with a heavy base, since a light base will skid or trip when the stick is moved with force.

■ If you are an avid fan of flight simulators, go for a stick that has three axes. This will give you better control over the rudder of a flying unit.

AD

Future of Input Devices

Futuristic Keyboards

If you're using a standard QWERTY keyboard—and most of us do—your keyboard design is over a century old. Keyboard design has stagnated over the last few years, and users do not have much choice as far as design goes. However, some vendors have launched products that are wacky, to say the least, and ergonomic as well.

For instance, SafeType Inc has launched a keyboard that they claim has been designed according to scientific biomechanical principles and virtually eliminates the high-stress postures that contribute to Repetitive Stress Injury. This device looks like a standard QWERTY keyboard that's been broken up into

three equal pieces.

The two outermost pieces are placed vertically, with keys on the outside, and a couple of mirrors placed alongside. The horizontal middle piece has the number keys.



A 'user-to-computer interface tool' called DataHand looks extremely futuristic and aims to minimise movement, thus drastically reducing the amount of effort needed for typing and pointing. The DataHand System consists of two interconnected hand units that can effectively assume the role of keyboard and mouse. The palm rests on rubber supports, and the fingers are placed on the keys just beyond. The thumb is placed in

the canal to the side of the palm support. When using this device, you would never have to lift your hand from the palm rest. Mastering this device takes a long time though.

The TouchStream LP lets you type using gestures. Incorporating a technology called MultiTouch, this device has the ability to detect multiple points of contact as well as detect patterns in their movement (or lack of movement). On recognising a gesture, the TouchStream LP will apply whatever behaviour has been assigned to that touch and movement pattern. The gesture recognition is accomplished on the same flat area that the keyboard is mapped on. In a nutshell, it enables a user to type, point and perform simple gestures, all on one surface.

Speech Recognition

Researchers have been working for a long time on alternatives to conventional modes of input. Although features such as speech and handwriting recognition are not new, they have just started to become mainstream and you can find these on devices such as tablet PCs.

Over the past few years, many vendors have come up with software products that can recognise the spoken word, but most of them have died out. Imagine speaking normally to your PC and having your words appear on the screen. The objective of accurate speech recognition has existed for a long time, but only recently has the dream become a possible reality.

Are we there? Not yet. Are we getting there? Sure! Depending on whether you use Windows XP, Microsoft Office's built-in speech engine or a third-party speech engine, ease of use, accuracy, and enjoyment of the feature may vary.

IBM and Dragon Naturally Speaking are two large companies involved in the development of speech recognition technology. Microsoft's Windows XP and Office applications incorporate this feature. The Tablet edition of Windows XP has significant improvements in this regard, and though complete accuracy is still difficult to achieve, users can look forward to exciting times ahead. Not only is this feature extremely useful for normal users, it also opens up a lot of options for the disabled.

In Windows XP, you can use either the Speech Recognition tab or the Text-

to-Speech tab in Speech properties to initialise and customise speech-enabled applications. These settings control general attributes such as input and output devices, the language used, as well as the playback voice and the accuracy of word recognition.

You can choose between several preferential option settings and customise the speech profile according to your needs. You can also create a new profile or set a profile to accommodate your speaking style. A new Recognizer Profile should be created if you move offices, the noise level changes on a permanent basis, or additional people are present.

Training allows the speech recogniser to adapt to the sound of your voice, word pronunciation, accent and speaking manner. This is done through the Voice Training Wizard. Training for even a short period can effect an improvement in the accuracy of speech recognition. The system also adapts to your speech on an ongoing basis, and recognition increases over time.



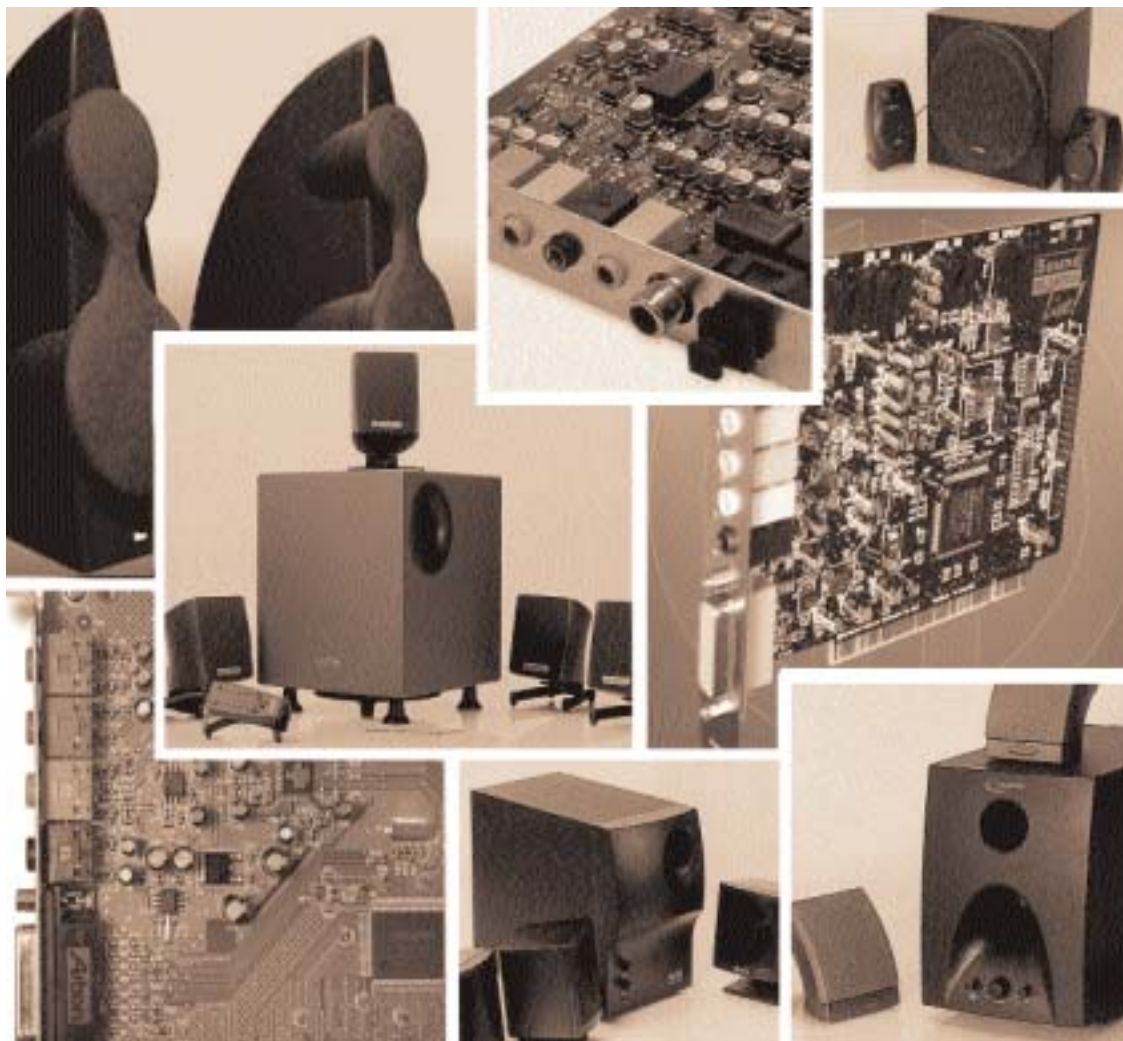
Handwriting Recognition

The Windows XP Tablet PC offers major improvements in handwriting recognition. You can write directly on the screen with a stylus, and what you write is converted to text that can be inserted into applications such as MS Word and Notepad. Consider the convenience of taking notes in meetings or conferences in your own handwriting, converting them to text later and e-mailing them to people. It's not only this convenient, but quite accurate too.

You can use handwriting recognition in programs that support it. These include Internet Explorer 5.0 or later, where you can use handwriting in text boxes that appear on Web sites, but not in the address bar; and Outlook Express 5.0 or later. In addition, all Microsoft Office XP programs, such as Microsoft Word 2002 or Microsoft Outlook 2002, and any other software program that is enabled to use the Microsoft handwriting recognition engine. To use handwriting recognition, you must first install a handwriting recognition engine, which is language-specific.

Buyer's Guide

GRAPHICS, SOUND AND SPEAKERS





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PC users in India are very price-conscious, but in a rather odd way. They may splurge on high-end processors and high-capacity hard drives, but when it comes to graphics cards they tend to stick with onboard graphic chips. Although such graphic chips cannot run most of the new games at playable frame rates, vendors often forget to reveal this fact to buyers.

To play games like UT2003 or Medal of Honor Allied Assault, you need to have a decent graphics card. Onboard solutions will at best let you play these games at the lowest resolution, and after sacrificing realistic visual settings. The other advantage of having a separate graphics card is dual monitor support, which makes work much easier.

Then there are cards that do much more than just churn out high frame rates. These high-end cards, which cost upwards of Rs 18,000, also come with a Video-in/Video-out module. This not only allows you to use your television as a monitor, but also to record TV programs on your hard drive using the bundled software. The TV-Tuner chip is an add-on that allows you to use that big 19-

inch monitor as a television. These are just some of the great things you can do with a good graphics card.

Hardcore gamers will not look beyond a high frame rate with full-scene anti-aliasing and anisotropic filtering—after all, eye-candy is what satiates their hunger.

The virtual experience will be incomplete if you use a paltry set of speakers driven by a stone-age onboard sound chip or an unknown sound card. You may have the best graphics card in the world, but it's completely useless if you can't hear that death-bullet before it hits you. Also, since prices of DVD drives have fallen in the last couple of years, many people buy these as well—and for watching movies, a good graphics card, a great sound card and good speakers are mandatory. Couple this with the TV-out feature of the graphics card, and you get a true home theatre experience. But if one of these three devices is a weak link in the chain, the whole experience goes for a toss.

It is thus very important to choose the best available graphics card, sound card and speakers that your budget can buy. As far as graphics cards go, you need to have some level of interest in PC-based gaming in order to want to invest a few thousand rupees on an AGP

card. The same goes for the sound card—if the motherboard has an integrated low-quality sound chip, expect to shell out anything between Rs 1,000 and Rs 12,000. The market is not as flooded by brands of sound cards as it is by graphics cards, because many users find a good quality onboard sound chip sufficient for their needs.

Some high-end motherboards offer integrated six-channel sound, which is as an attractive feature. This makes more sense, as the user gets a complete solution which lessens the headache of maintaining additional add-on cards. The best part about having onboard sound is that this does not hinder your upgrade path—if you feel the need for better sound in the future, just disable the onboard sound from the BIOS, and install a new card.

Remember it's the speakers that deliver the sound. No matter what sound card you use, if your speakers are not capable of delivering and handling enough power, you may find Britney Spears screeching like a peeved parrot (on second thoughts, that may not be the fault of the speakers at all). Speaker prices, like that of other peripherals, have also come down. The price at which 2.1 channel speakers were available earlier, can now buy you a decent set of four-point surround speakers.

Market Overview

Graphics or video has been one of the fastest moving segments of IT in terms of development. It has come a long way from 256 K memory-based graphics cards to the latest nVidia's GeForceFX chipset that can support 128 MB DDR2 memory, and requires special cooling when running at full throttle. The Indian market for high-end graphics cards has been dominated mainly by demand from gamers, and today some of the mainstream cards available include the Geforce4 MX from nVidia and the ATi Radeon 7500/8500LE, with prices ranging from Rs 4,000 to Rs 8,000, depending on the brand.

For instance, Asus and Gainward cards come at a higher price as they are bundled with a lot of goodies—games and applications. On the other hand, cards from brands like Ennyah and Xserve are targeted more at budget-conscious users looking for plain vanilla cards. A good example of this is the SMedia Radeon 9700 card, which is sold in a box the size of the low-end TNT2 card, with only a driver CD and a manual within.

For value users, TNT2 chipset cards are still the front-runner. That's apart from the ever-popular Intel's 815 integrated onboard graphic chipset for the Pentium III—and now the



845 chipset for the Pentium 4, more suitable for business class users. TNT2 chipset cards are available for around Rs 1,000 to Rs 1,500. On the other hand, motherboards supporting AMD processors have the NForce 2, which is more suitable for those who aren't avid gamers. These onboard graphics cards from nVidia and ATi have been a great success, and helped vendors bring down the cost of PCs by at least 15 to 20 per cent.

Market reports indicate that in the coming months, this segment would see little momentum in terms of volume. And at the technology level, no major development is predicted.



Apart from the GeForce FX launched recently, the new roadmap from nVidia does not indicate any further development in the high-end graphics cards segment. Only a drop in prices for mid-range and high-end

cards would persuade users to buy newer cards.

The speaker segment has also seen a major upward shift in terms of technology and availability of brands. Almost all PCs sold today support multimedia, and so speakers have become virtually indispensable. Brands like Creative, Logitech, Altec Lansing, Typhoon, Frontech and Samsung are the front-runners; with a market share of around 70 to 80 per cent. Other brands like Artis, Bose, JBL, Mercury and Sumoku are not far behind, and doing quite well in some pockets. Today, the demand for 2.1 and 4.1-channel speakers is on the rise, and prices have dropped by 25 to 30 per cent over the years. Some 4.1 speakers—Artis, for example—are available for as low as Rs 3,000. And some 2.1 speakers—Frontech, Typhoon and Mercury for examples—are available for just Rs 1,200 to Rs 1,500.

Creative recently unveiled its 6.1-channel speakers in the premium segment, at a price tag of Rs 10,000, targeted specifically at movie lovers and hardcore gamers.

Around 80 per cent of the sound cards sold today are onboard, offering basic stereo support and targeting the value segment. Others like Creative Vibra 128 or Audigy offer true 5.1 channel support. Creative also has Extigy, which claims to be the only external sound card available in the world. This was launched last year, keeping in mind the growing demand by professionals for high-fidelity sound cards—to be used by plugging and playing on several PCs. Brands like Zoltrix also figure in smaller numbers, especially in western India, at a competitive price of around Rs 2,000 for a 4.1 speaker set.

Jargon Buster

3D textures: It makes hollow objects solid with true 3D material properties such as wood grain or marbling.

Pixel Shaders: A part of the latest APIs, such as DirectX 9.0, Pixel Shaders allow realistic lighting and surface effects.

Anisotropic filtering: A screen pixel is elongated when it mapped onto the texture space. This is known as anisotropy, a malady that conventional texture filtering techniques (such as bilinear filtering) cannot cure. Anisotropic filtering aims to sharpen a texture by using varying algorithms that basically serve as 'corrective glasses' to alleviate the elongation caused.

it's
unbelievable!



*see page 170-171



Buying tips for Soundcards

- **Define your usage.** If you are an avid music lover, go for a soundcard that supports multiple channels (like 4.1 surround). If you want a gaming solution, buy a card that supports the standard 3D sound APIs, like DirectSound, EAX, A3D and I3DL2.
- The vendor should provide a minimum of a one-year warranty for budget soundcards (under Rs 2,000) and at least a three-year warranty for more expensive ones.
- Before buying, make sure that the soundcard's interface is PCI or USB and not ISA. If you plan to use your soundcard for playing games or watching DVD movies, get a PCI soundcard.
- Check that the soundcard you are buying has drivers for your favourite operating system. Windows users should not face problems, but the software required for Linux, for example, might be hard to come by.
- If you are an audiophile and care about things like signal loss, buy a soundcard that has gold-plated connectors on it.
- Check to see if the soundcard comes bundled with a decent variety of applications (such as games and media players). If you are a first time buyer, these will prove very useful to get you started with your soundcard.

Buying tips for Speakers

- **Power rating:** In most speaker systems available today, the power rating, in watts, is deceptively specified as Peak Music Power Output (PMPO). This particular specification is nothing but marketing hype—you should always go by the RMS power of a speaker system as this is the true technical measure of the speaker's capability to handle continuous power. For surround sound speaker systems, a rating of 40 Watts RMS is a good place to start for your computer-based surround speaker system.

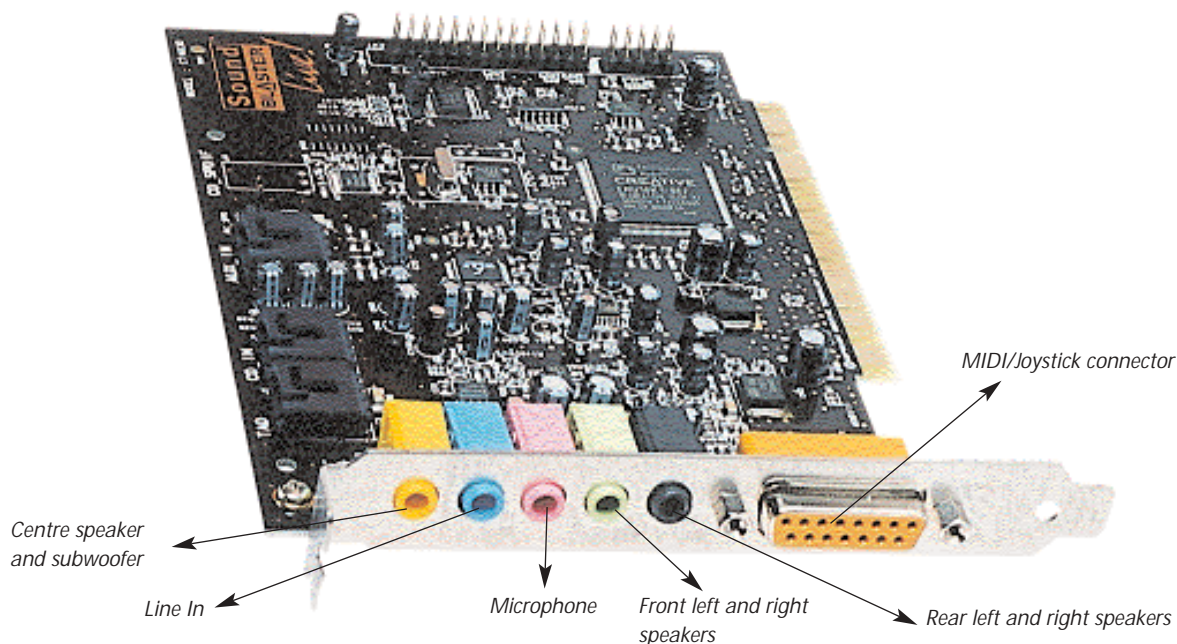
■ **Frequency response:** If your speaker system has a frequency range that is limited at the upper end (for example, if it cannot perform above 16 KHz), you will not hear any of the high treble, and will lose definition in your music, especially if you listen to a lot of classical music. Similarly, if your speakers can't go below 50 Hz, they won't be able to render deep bass well, like drums, and explosions in movies.

■ **Stands:** If you have 2.1 speakers that are primarily meant for music playback, you won't need to have speaker stands as you would probably place them right on your desk. However, if you have a 4.1 or 5.1 speaker system, you would need to ensure that they either have stands on all the satellites, or a base attached to these speakers. This is useful if you want to place them behind you on a wall, or even standing on the floor at ear-level for proper surround sound imaging.

■ **Controls:** Speakers with an in-line volume control give you the freedom to control the master speaker volume without having to reach troublesome locations like the subwoofer where the volume controls are generally placed.

■ **Audio inputs:** If you have a 2.1 stereo speaker system, you only need standard analogue left and right channels. However, in the case of a four-point surround sound system, you would need to look out for four separate channels of analogue audio inputs to your speaker system. This would be in the form of two 3.5 mm stereo inputs (left/right for front and left/right for rear), or four separate RCA inputs. Also watch out for pseudo-four channel speakers that are basically just stereo, with two speakers for each side. In the case of 5.1 speakers, you would either need to have six separate RCA inputs for the discrete AC-3 channels (if the signal is already being split by an external decoder like in the Sound Blaster Live! 5.1 DE soundcard), or you would need a DIN connector that is fed by the digital output of your soundcard in order to have true Dolby Digital rendering in your surround sound system.

Soundcard Connectors Demystified



Video Vanguard

With the demise of 3dfx, ATi and nVidia are the only high-end graphics chip manufacturers with significant market domination.

Mainstream desktop display solutions starting from Rs 1,500 to Rs 40,000 are now available in the market with a great number of manufacturers offering a wide variety of solutions in the lower segments. With an increase in competition, the choices available have now improved significantly.

Technology Insight

The main aim of a graphics accelerator is to process the 2D or 3D elements associated with the GUI and games or software applications. The execution of graphics involves the transfer of texture maps, image geometry, commands etc., over to the accelerator for processing.

Smart Tips

Graphics processor: The core of a graphics card, this is the component that actually processes the video information. Some of the best graphics processors in the market are the

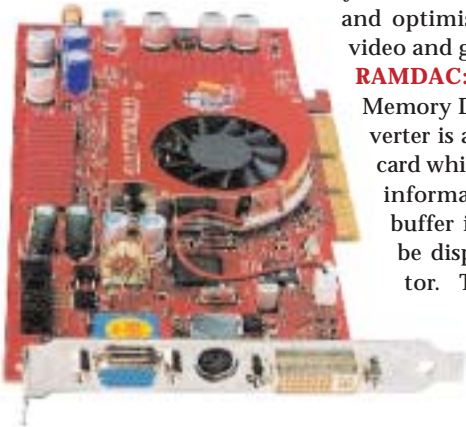
nVidia GeForce FX and the ATi Radeon 9800 Pro.

Video RAM: Video RAM on the graphics card is used to store the extensive graphical information, such as textures of 3D objects. It is also used as the frame buffer—the part that holds the final frame that is to be displayed on the monitor. This RAM is very similar to system RAM, except that it is faster and optimised for working with video and graphical information.

RAMDAC: The Random Access Memory Digital to Analog Converter is a chip on the graphics card which converts the digital information in the frame buffer into a signal that can be displayed on your monitor. The RAMDAC on a graphics accelerator is specified by a frequency. The higher the frequency of the RAMDAC, the

greater the resolutions and refresh rates that can be supported by the card.

Interface: The best choice available today is the AGP interface, which provides a very high-speed pathway for moving large quantities of graphic and image data between the graphics card and the rest of the system.



Also Remember...

■ All video cards use a VGA output connector that allows the signal to be displayed on a monitor. Some cards supply and receive the video signal from television monitors, projectors and video cameras through optional coaxial or S-video interfaces.

■ Some cards have a feature connector which supports devices such as a TV tuner or a video capture board. A special flat ribbon connector is used to connect the video card to these additional devices.

■ The memory bandwidth refers to the rate at which data is transferred between the graphics processor and graphics memory. The effect that memory speed has on the total memory bandwidth and the importance of it, can be understood by looking at the following examples:

- GeForce FX5800:**
128-bit (16 bytes) x 800 MHz
= 16 x 800 = 12.81 GBps
- GeForce2 Ultra:**
128-bit (16 bytes) x 460 MHz
= 16 x 460 = 7.36 GBps
- TNT2 M64:**
64-bit (8 bytes) x 125 MHz
= 8 x 125 = 1 GBps

Decision Maker

	Limited budget	Should run most games, but price is a consideration	Top-notch performance in 2D/3D, price no
You need	A card that will run at 32-bit colour and 1,024 x 768 at 85 MHz with support for the odd game at low resolutions	A card that will give you a minimum of 30 fps in low to medium resolutions with little compromise in quality	Maximum performance with all the eye candy enabled and no compromise on either resolution or quality
Look for	Cheaper or lower variants of faster chips. A card using the AGP interface with minimum 16 MB onboard RAM	A card with at least 32 MB or more memory	A card with 64 MB RAM or more with features such as dual-monitor support
Our pick	Riva TNT2	GeForce2 MX 200	ATi Radeon 9700 Pro, Geforce FX 5800
Price range	Up to Rs 1,500	From Rs 2,500 to Rs 5,000	Rs 36,000 onwards

Power Tips

Step-by-step procedure for installation of a graphic card

As new games are released, one feels the need upgrade to a newer generation of graphics cards. If you would like to move to a new graphics card but are not sure how to go about successfully installing it, these tips will prove useful.

Before opening the cabinet and pulling out your old graphics card, uninstall the drivers for the old graphics card from the Control Panel. Now, shut down the computer and open up the cabinet carefully. Remove the VGA connector attaching your monitor to your video card. Pull out the old graphics card carefully. Hunt for the AGP slot (which is brown in colour and smaller than white PCI slots).

Now you can insert the new graphics card into the brown slot and screw it in tightly. Close the cabinet and switch on the computer. The card should be recognised by Windows, and Windows will install the basic VGA drivers.

When asked to install the drivers for the card, choose No, and continue. Insert the driver disk provided with the card and follow the on-screen instructions to install the drivers for the card. Restart your machine and your new graphic card should be installed successfully.

In case your graphic card does not come with the driver software, you can download generic detonator drivers if your card has an nVidia Video Chipset (find them online at www.nvidia.com), the Catalyst drivers if you have an ATI-chipset based card (www.ati.com), or Matrox drivers if so required by your card (www.matrox.com)

Watching TV on your PC

Watch television on your PC! This is one more step towards making the personal computer the centre of all your activities. Apart from live telecast, TV tuner cards come with other capabilities like recording and playback, making television viewing more flexible than ever before. The hardware consists of an AV/Tuner Box, and cables that connect it to the video card. The coaxial cable goes into the tuner box instead of in the back of your TV.

Personal Video Recording (PVR) software lets you preview TV channels and encode the broadcast into MPEG 1 or MPEG 2 video format in real time. It also allows you to record your

favourite program in case you're busy at the time of the telecast. You can then watch the recorded program at your convenience. The time-shifting feature allows you to pause, replay or skip live TV without interrupting an ongoing recording session. This feature allows you to take a break while watching a live show, and resume where you left off. You can also capture stills.

However, keep in mind that storing movies in MPEG format takes up considerable space. The memory requirement will depend on the quality of the recording. For example, a one-

minute MPEG-2 file recorded at 720 x 480 resolution and a good bit rate would take up about half a gigabyte of memory. So think twice before you record interminable TV soaps, especially if storage space is scarce. In any case, you will definitely need a CD-RW drive to archive your recordings.

There's usually a user-friendly control panel for performing all these functions. A fully functional remote is also provided with some models like the Compro VideoMate. The installation process is quite simple, and is clearly explained in the

user's manual. Get a large, high-resolution PC monitor—and leave it to your PVR to record your favourite program while you read this article!

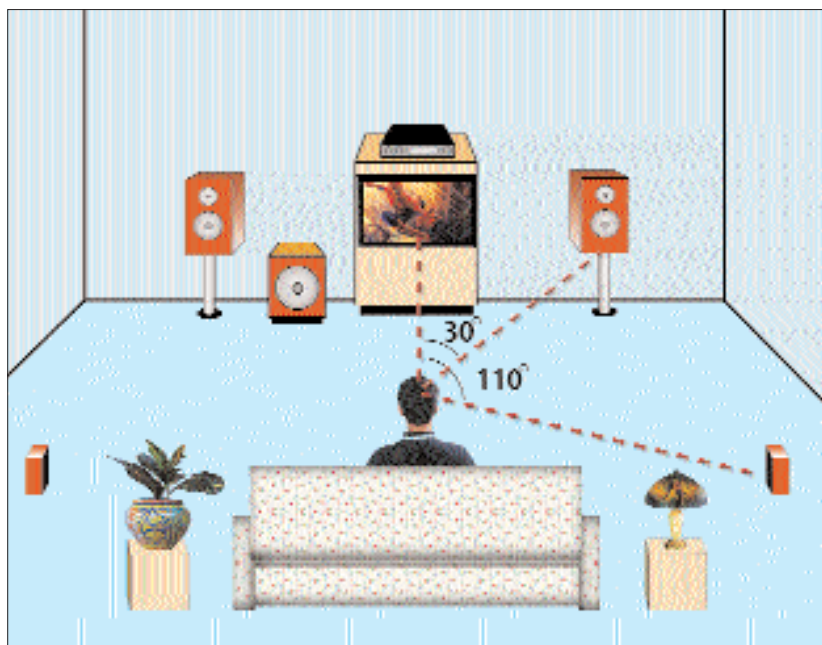
Speakers

Optimum Speaker Placement

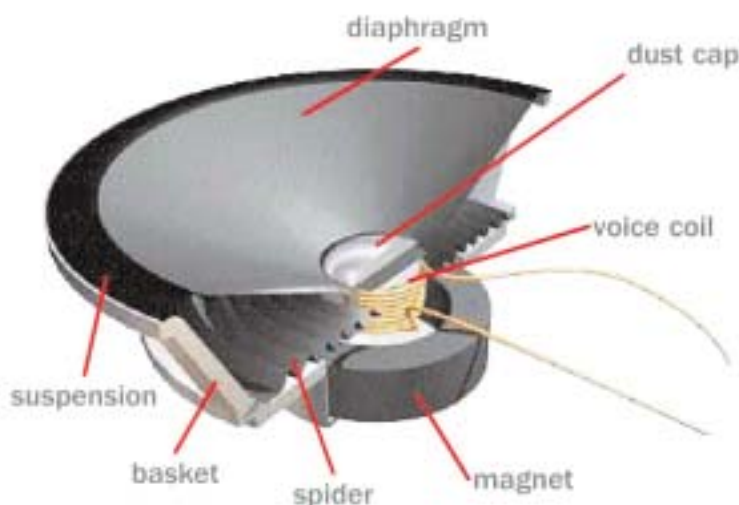
To get the best out of your home theatre system, place the left and right speakers along the width of your room. From where you are going to sit, the front speakers should be approximately 60 degrees apart from each other with the listener at the reference central position. The rear speakers should form a 110-degree angle from this reference position.

For optimum effect, the four speakers should be kept at (or slightly above) ear level. You can place the subwoofer anywhere. If you find that the bass in your system is a little low, place the subwoofer facing a wall, preferably in a corner of the room.

If the surround sound channels are too faint, 'toe-in' the surround speakers so that they point towards the listener. Conversely, if they are too prominent, place them facing the wall as this helps disperse the sound from the rear channels, resulting in a more enveloping effect.



Under the bonnet of a Speaker



Speakers: Do's and Don'ts

Do's:

- ✓ Wipe the speakers using a soft cloth dampened with a mild detergent
- ✓ Lightly vacuum the grille to remove dust particles

Don'ts:

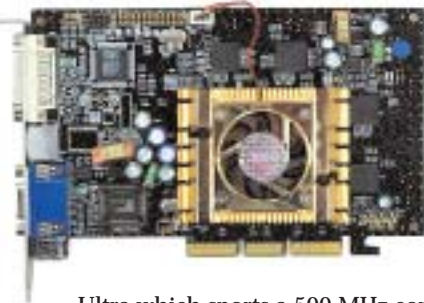
- ✗ Do not listen to music at extreme volumes; reduce the volume when you can notice distortion
- ✗ Never unplug the speakers while they are on
- ✗ If you use an adapter that did not come with your speakers, make sure the ratings of the amplifier (in RMS wattage) and adapter (in ohms) match, or you could cause severe damage to your speakers

The Future of Graphics, Sound and Speakers

The future of graphics cards and gaming has always dominated Web site and magazine headlines. The abiding interest computer buffs have in graphics cards was mainly generated after manufacturers started fiercely competing with each other for the coveted top slot. The gaming industry is the main engine behind this growth. Developers like ID software and EPIC MegaGames continue to release ever-demanding games that require the appropriate hardware.

The reigning king, nVidia, and the almost-there ATi are two

major rivals who keep this arena hot-as-hell by coming out with souped-up technologies as fast as microprocessors change. The latest graphics chipset from nVidia is the GeForce FX 5800



Ultra which sports a 500 MHz core clock and a memory clock of 1 GHz.

The graphics card market last year also saw companies like SiS and Matrox entering the fray with offerings in the mid-range segment, fuelling the competition even more. The largest market anywhere in the world for graphics cards is the value segment, therefore once the company comes out with their most powerful chipset they also start to offer stripped-down versions of the same chipset at much lower, affordable prices.

So what does the future hold for graphics cards? Take two new cards—the Matrox P650 and the P750. These cards are equipped with some improved technologies like dual DVI output, dual-display gamma correction, fully symmet-

ric RGB output, Matrox-dual-display plus TV output and older triple-head output. And ATi and nVidia are working hard to come out with better and improved drivers to eliminate any issues their cards may currently have with some games and operating systems.

Trident and VIA (Savage graphic chip) are also in the race but in a very small way. Trident offers a very low-level solution (Blade XP) and VIA integrates the Savage Pro graphics chip into their motherboards because there's virtually no market for their graphic solutions if sold separately. But not everyone requires the best graphics cards, and not many can afford them. So most of these companies will survive some way or the other.

Speakers and sound cards don't change at the same pace as graphics cards. However, players like Creative (whose products are widely available in India), Zoltrix and Turtle Beach are offering sound cards with improved technology, but these cards are mainly bought by professionals rather than regular desktop users because of the high prices. American company M-Audio has also started offering a 7.1-channel surround sound card, increasing the number of speakers to eight, with 24-bit/192 KHz audio for enhanced audio experience.

Some labs are already working on 9.1-channel surround sound. This increase in the number of channels (and hence, speakers) will not only make future movie experiences more immersive, but also give hardcore gamers an edge over rivals by allowing them to precisely predict where an attack is coming from, and move out of harm's way.

There are more models of speakers available now than ever before, and there's been tremendous improve-

ment in packaging as well. Harmon Cardon speakers, for instance, come with a glass shell in which the drivers are enclosed. Before long, speakers could well become a design statement.



Buyer's Guide

POWER CONDITIONING





We've all experienced power failures at some time or the other. Whether you live in a metro that has relatively dependable power or in a smaller city with regular power outages, electricity problems can throw a spanner in the works of our gadget-dependent lives. In fact, electricity is the life force behind most of the work we do daily.

Office and home desktop computers, company networks and communication systems such as phones and fax systems—if any of these undergo a downtime during working hours, it can spell a substantial loss of money and, worse still, data. Besides, with the arrival of the monsoons, the reliability of power delivered to our homes and offices plummets to an all-time low.

Without Power...

Just as in any other combat situation, you need to know what you are up against before choosing your line of defence. There's a general misconception that a power failure involves just one situation—a blackout. This is but one of several problems that can be attributed to power failure. Here are the different types of power fluctuations that can occur:

■ **Blackout:** This is when there is a total power failure. It is akin to a light being switched off—the power from your electrical outputs falls from normal level to zero.

■ **Brownout:** This is a condition where the output voltage drops to a lower level than its normal value (230 Volts in India) for an extended period of time. This can affect the operation of electronic equipment and even

cause damage.

■ **Power surge:** Here, the power level rises above the normal value for a period and then drops to normal. This condition can be detrimental to electronic equipment—while most computer hardware can handle slightly higher input voltages over small periods of time, powerful surges can spell instant death for electronics if they are not protected.

■ **Voltage spike:** This is a condition where there is a brief impulse of a very high voltage, after which it returns to the normal. This condition can be lethal to sensitive electronic equipment, including computers. Such conditions often occur during rainstorms—when a bolt of lightning hits a power line, for instance.

■ **Frequency variation:** Here, the frequency of the AC voltage differs from its normal value of 60 Hz (the default frequency for conventional AC power in India). This can cause electronic equipment to malfunction. Computers are especially affected, as they are so dependent on voltage frequency.

Each of these faults in power can be caused either due to faulty wiring (lack of proper earth for your power lines), faults in the power lines themselves, errors in the power transmission grid and weather conditions such as lightning and storms.

...But Not Powerless

The implications and the extent to which each of these conditions can affect computer hardware are different. Accordingly, there are different solutions available to counter them.



Buying tips for UPS

A UPS is specified by its VA rating. This is a measure of the amount of power the UPS can provide—usually for about 10 to 12 minutes. Therefore, if a 500 VA UPS is loaded with equipment that draws 500 VA of power, it will last for about 10 minutes. If the load is halved to 250 VA, the backup time will increase to 16 to 18 minutes. This is assuming, of course, that the battery is fully charged and functional. Hence, when buying a UPS system, you should first ascertain what equipment is going to be connected to it and, more importantly, what kind of power conditions you want to protect your equipment from.

UPS systems should be used to power only the most critical parts of your computer. The following points need to be considered while buying a UPS:

■ **Input voltage range:** This is the range beyond which the UPS will deliver power through its batteries. The greater the range the UPS can handle, the more versatile its power protection. Look for a voltage range between 150 and 270 V.

■ **VA rating:** This is a rating of the power that can be provided by the UPS. You should choose the rating on the basis of the

requirements of the equipment you are going to connect to the UPS. As a rule of the thumb, a 1 GHz processor-based machine with a 20 GB hard disk, CD-ROM drive and 17-inch colour monitor would require a 500 VA UPS.

■ **Backup time:** This is the specified time for which the UPS can provide power from its battery for a given load. Look for a backup time of at least 10 minutes at maximum load.

■ **Switching/transfer time:** Used interchangeably, switching or transfer time is the time taken by the UPS to switch from normal delivery power mode to battery mode when it detects any power anomalies. Ideally, look for transfer times under 5 milliseconds.

■ **Alarms and connectivity:** Most UPS systems have LEDs on the front panel that indicate the state of its batteries and the condition of the input and output power. This visual indication of its operation is important, especially during power failures, so look for a UPS that has these indicators.

■ **Charging time:** This is the time taken to charge the UPS batteries from a completely drained state to a fully charged condition. This should be between 4 and 6 hours.

The solution you opt for is also decided by your budget and the level of protection you require for your hardware.

When combatting power problems, there are several weapons with which you can arm your sensitive electronics components.

■ **Circuit breaker:** This device is a switch capable of responding to dangerous overload levels in an electrical circuit. When installed, the switch detects if the current level of a line is too high and instantaneously (in tens of milliseconds) 'trips' and switches off. This effectively disconnects the circuit it's connected to and prevents the equipment from receiving dangerously high input power levels. However, since it effectively switches off the power, it's a rather quick-and-dirty way to implement power protection.

Circuit breakers are particularly useful if you want to protect your computer from damage due to failure or malfunction of other equipment that is on the same circuit as your computer. The circuit breaker does not provide any backup power, nor does it regulate the voltage reaching your equipment. For good power protection, this system should be implemented in conjunction with one or more of the methods given below.

■ **Spike buster:** This device comes almost as standard with new computer purchases. A spike buster (also called a surge suppresser) looks similar to a power strip that provides added power outlets, except that it contains circuitry that can detect impulse increases (or spikes) in the input voltage. When it detects a higher voltage, it shuts off and its fuse opens. This prevents a dangerously high voltage from reaching your equipment. Such devices can protect your computer in case of errors in power lines or even lightning strikes, which can cause sharp voltage increases. However, in case of a power failure, a spike buster will not be able to power your equipment, hence it is not the best way to implement power protection.

■ **Stabiliser:** A stabiliser is a slightly better device for power protection—it's capable of detecting both power surges and brownouts and can rectify them to deliver a regulated AC voltage to your computer. It continuously senses the input voltage (and in some cases even the output voltage). It uses a closed

AD 12m x 25 cm

feedback circuitry to clamp the output voltage to a constant value by either bucking (lowering) or boosting (increasing) the input voltage, depending on its level.

The principal element of a stabiliser is a transformer whose output voltage is controlled depending on the input voltage. It controls the output voltage between the low and high voltage thresholds at which the device operates, but if these limits are surpassed, it simply switches off. A stabiliser cannot regulate the frequency of the output voltage or provide any form of backup power, but does provide adequate control of voltage for most applications in case of occasional low-level fluctuations.

■ **UPS:** This is the most effective way to implement power protection. A UPS is a device capable of maintaining pure AC power and can even provide backup power in case of very poor input power or a total power failure. Here, DC power provided by the UPS batteries is converted into AC power by an

electronic circuit called an inverter. This gives clean power to the equipment connected to it.

There are three types of UPS systems in use—offline, online and line-interactive. In an offline UPS, the equipment is driven directly by the mains power as long as it remains within threshold limits of the minimum and maximum values. During this time, the batteries of the UPS are continually charged. In case of an extreme power condition or a power failure, the UPS switches on very quickly (usually under 5 milliseconds) to the batteries.

In an online UPS, the equipment is continually driven through the batteries even during normal conditions, during which time the batteries also charge. Therefore, this type of UPS understandably provides the purest form of power protection available—no matter what the input power conditions, the output power is provided through the battery.

The ultimate protection

Anti-virus protection is dandy, but how do you safeguard against losing valuable data to a black out? Prevention is better than cure, invest in a suitable power protection system to safeguard your equipment and data.

Before you buy a UPS, you need to add the total power consumption of your system. Decide which pieces of equipment need UPS support. Typically, only the CPU and monitor are supported, this reduces the power drawn from the UPS.

If the power draw is expressed in Amps, then multiply that value by your nominal line voltage (230V). If the power draw is expressed in Watts, multiply by a factor of 1.3 to 1.4 for VA load. For example, 250 Watt power supply (x 1.4) = 350 VA load (assuming that your monitor is drawing power from the power supply of the PC). For redundancy and safety, a 500 VA UPS should be enough for most PCs.

Technology Insight

Here's how the UPS system works and keeps your computer up and running. The rectifier or the charger converts the incoming Alternating Current (AC) mains into Direct Current (DC), which is used to charge the battery, and in some cases to power the inverter. Then the inverter takes DC power from the rectifier or the battery and converts it into AC power for the load. Most UPS systems include additional filters to eliminate spikes.

Smart Tips

■ **Input voltage range:** This is the range beyond which the UPS delivers power through its batteries. The greater the range the UPS can handle, the more versatile its power protection. Look for a voltage range between 150 and 270 volts.

■ **VA rating:** This is a rating of the

power that can be provided by the UPS. You should choose the rating on the basis of the power requirements of the equipment you are going to connect to the UPS. As a rule of thumb, a 1 GHz processor-based machine with a 20 GB hard disk, a CD-ROM drive and a 17-inch colour monitor would require a 500 VA UPS.

■ **Backup time:** This is the specified time for which the UPS provides power from the batteries for a fixed load. Look for a backup time of at least 10 minutes at maximum load.

■ **Switching/transfer time:** Used interchangeably, switching or transfer time is the time taken by the UPS to switch from normal delivery power mode to battery mode when it detects power anomalies. Look for transfer times of less than 5 milliseconds.

■ **Alarms and connectivity:** Most UPS systems have LEDs on the front panel that indicate the state of its batteries and the condition of the input and output power. This visual indication of its operation is important especially during power failures—look for a UPS that features these indicators.

■ **Charging time:** This is the time taken to charge the UPS batteries from a completely drained state to a fully charged condition. This should be between 4 and 6 hours.



Decision Maker

	Single computer protection	Mission-critical applications
You Need	Protection for a single computer comprising a monitor, system unit, keyboard and mouse, for example, a 1 or 2 GHz processor-based machine with a 20 GB hard disk, a CD/DVD-ROM drive, 256 to 512 MB of RAM and a 17-inch monitor	Protection for a server that needs to be continually running with mission-critical applications, for example, a 1 GHz-processor, with up to 1 GB of RAM, up to four SCSI hard disks, a CD-ROM drive, backup device and a 17-inch monitor
Look For	An offline or line-interactive UPS with a 450 VA to 650 VA rating, and a backup time of 10 minutes	An online UPS with at least 1 KVA rating, and a backup time of 10 minutes. It should also support remote monitoring through a serial port with alarms and indicators in case of power anomalies



Also Remember...

- To buy a UPS all you need to do is add up the total power draw of your equipment.
- First, decide which pieces of equipment need UPS support. Typically, only the CPU and monitor are supported to cut down on power draw to the UPS.
- If the power draw is expressed in Amps then multiply that value by your nominal line voltage, 230V. If the power draw is expressed in Watts, multiply by a factor of 1.3 to 1.4 for VA load.
- Example: 250 Watt power supply (x 1.4) = 350 VA load (assuming that your monitor is drawing power from the power supply of the PC). Add a measure of safety and 500 VA is enough for most PCs.

Power tips for UPS

- Before cleaning the UPS, make sure the power is completely switched off. Then unplug all the attached peripherals and clean the UPS with a dry soft cloth.
- It is advisable to completely charge and

discharge the battery of the UPS once a month to prolong the battery life. To do this, run the computer from the battery itself so that it is completely discharged, and then recharge it.

Future Of The UPS



UPS systems have come a long way from being just batteries connected to small circuits in a box. Today's UPS systems, especially those catering to the enterprise segment, have control and power management features that would put some of the geekiest equipment to shame.

With time, UPSes have evolved from being simple, relay—controlled switching behemoths to DSP—based compact systems. The search is still on for the perfect UPS, which will have features like optimum redundancy, highest MTBF (mean time between failures), lowest MTTR (mean time to repair), best power control features, better remote management features and so on.

One of the biggest boons to the enterprise has been the introduction of centralised UPS systems. Earlier, the power-conditioning infrastructure depended mainly on distributed UPSes for smooth, clean power flow. In centralised UPS solutions, a single UPS is used to feed a dedicated ring main, which supports several critical load items. Although it's an expensive solution, such centralised UPS systems are more versatile and cost-effective in terms of load utilisation and battery capacity. They're easier to maintain, upgrade and manage than distributed UPSes. The price per KVA also comes down with such systems. It's much easier to configure the power conditioning system in case new additions have to be made to the network.

The next trend in the Indian UPS industry would be a major shift towards reliability, man-

ageability and intelligent products. UPSes are as important for mission-critical applications as any other element, and reliability is a major issue. At the same time, intelligent products will be able to maximise power availability for the equipment that needs it most, shutting down non-necessary equipment at different stages of battery usage. Running costs will also be a driving factor.

Terms such as Reliability, Redundancy, Intelligence and Remote Manageability are new buzzwords of the power conditioning industry. Without a doubt, UPSes will very soon be synonymous with power conditioning, as other solutions simply cannot compare with the power that a UPS can offer you.

As UPSes grow in popularity, expect to see a shift towards top-of-the-line online UPSes. This shift will be made possible by falling costs, as technology becomes cheaper and more accessible. Online UPSes feature more interactivity and scalability, not to mention greater standby time. Considering the direction the power conditioning industry is headed, and observing the technologies being developed to enhance reliability and efficiency, we'll certainly hear more about these devices soon.

UPSes are gaining increasing visibility among home users as they realise the importance of securing their expensive electronic equipment from the vagaries of Indian power companies. It won't be too long before we see a UPS in every home.

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Buyer's Guide

LAPTOPS & HANDHELDS



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Okay, so your assortment of portable devices—PDA, digital diary etc—make you feel you're the King of computing-on-the-go, but haven't you ever wished you could do more with these devices? That you could play more than chess or do more than read an e-book or listen to MP3 music when you're bored with that in-flight movie? That you could go beyond just editing of your Word and Excel files on your PDA? That you wouldn't miss your laptop so much?

Handheld devices already let you take notes, schedule your day, catch up on e-mail messages or plug in headphones to listen to MP3s during your daily jog. You can even use them as a stand-in for times when you cannot—or do not—want to take your laptop with you. But they still fall short of being the complete companion for your computing needs on the road.

This void for a portable device that's somewhere between a laptop and a desktop in computing power and is still small, is being filled by a slew of futuristic portables. These new devices incorporate technologies that integrate several functions into an all-in-one device that's also easy to operate.

Market Overview

A processing powerhouse that sits on your lap is no longer a dream. Some laptops available today are real powerhouses in themselves, with processing speeds as high as 2.4 GHz, with 512 MB DDR RAM, and they come with DVD-Writers and other matching peripherals. Laptops once considered to be worthy only for top-of-the-line marketing teams are now becoming a reality for most professionals on the move. Although many vendors are still pushing Celeron-based PCs, some vendors such as Toshiba, HP, Sony, ACi and Fujitsu have geared themselves up with the latest technology and are offering Centrino-based PCs, along with an option of tablet functionalities.

Today, mobile PC technology is moving at a brisk pace. Features such as support for Bluetooth and wireless networking support are no longer a futuristic dream. Most users who've used a desktop for a couple of years and have got hooked to it now want to move on to a laptop. In

sync with this, vendors have been reducing laptop prices to make them affordable to all, with varying levels of success.

Now there's an alternative. The 'desknote', which is more of a laptop but big enough to replace a desktop, has started gaining momentum, largely due to the cost factor. A chief feature of the desknote is that it does not come with a built-in battery—the same is available as an optional extra. One of the prominent brands available in India is the Kobian desknote, which costs from Rs 45,000 to Rs 55,000 depending on the model.

Technological development in this segment has been tremendous, and the emphasis is on making products lighter on power. Intel, with its SpeedStep technology for mobile processors, promises longer battery life. Transmeta's Crusoe processors consume the least power and are specifically designed for mobile devices. AMD uses its PowerNow technology for longer battery life.

In the last couple of months we've seen rivals such as IBM, Toshiba and HP battling it out.

All of them launched new models, particularly with the Centrino platform targeted at the premium segment. Celeron-based notebooks form a major percentage of notebooks sold in the entry-level segment, where there is a large market for refurbished notebooks. These notebooks, which are often backed by service and support, provide good value for money at prices that range between Rs 30,000 and Rs 40,000.

With increasing demand, vendors are also looking at providing more flexible solutions. Some, such as HP, Acer and Wipro, are even considering setting up assembly plants in India.

Among handhelds, a trend observed is that of providing solutions rather than a product. Hence a couple of vendors have started concentrating on software development. With bigger brands such as Sony, HP and Palm failing to make an impact on the higher price bracket, vendors such as Pushpam have started targeting the government sector to gain momentum.

Overall, the mobile segment is seeing increasing demand, particularly in low-cost solutions, and is poised to attain new heights in the coming months.



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F R A N C H I S E E N Q U I R I E S C O L L E C T E D

Note Perfect

Notebooks come at a premium, but for anyone who needs to be mobile, it's a premium that's worth paying. Laptops generally lag considerably behind desktop PCs in absolute performance, and upgrades can be really expensive. Compaq, Toshiba, IBM, and Dell dominate the international laptop market.

Smart Tips

Size/weight: The weight ranges from 1.5 kg to 4 kg and it could be as little as 1-inch thick. External power supplies and peripherals can add considerably to the weight.

Display: This will require a compromise if you decide on an ultraportable model. Most displays now support 1024 x 768 pixels and a 14-inch notebook display may be larger than most 15-inch desktop CRT units.

Processor: While the Crusoe, Duron and Athlon mobile processors are available, Intel's mobile processors are more popular.

Battery: Realistically, the uptime for most Lithium-ion battery powered models is about three to four hours.

Keyboard: If you are going to be doing a lot of typing, a larger keyboard will add considerably to your comfort. Having the eight cursor-control keys is very important.



Drives/bays: Though, it makes sense to have all drives (floppy, DVD/CD ROM) built into the main casing, a hot-swappable bay gives you greater flexibility.

Hard drive: Capacity ranges from 6 GB to 50 GB. Most users find 12-20 GB enough. Anyway you will not save much by buying a smaller capacity HDD, and will pay a lot more to buy a bigger capacity drive.

Communication: Look for a built-in 56 Kbps modem with a RJ-45 connector for your phone line. If you spend a lot of time on a network, you will also want a built-in Ethernet port. While IrDA

is available on many units, this has not really been a popular option.

Pointing device: You can choose between a pointing stick (like IBMs Trackpoint), or a touch pad. Pointers are easier to control but can give you a sore finger especially if used for a long stretch of time.

Ports: Most peripheral devices connect to a USB port; make sure you have at least two USB ports. You will also need parallel (for printers), serial, and PS/2 (for keyboard/mice) ports.

Docking stations: This is useful if you are using your notebook as a desktop replacement.

Decision Maker

	Entry level	Desktop replacement	Ultraportable
You need	A purely functional device that offers what any casual user might need, at affordable prices.	Something that gives a high performance, and has several extra features as well	An ultra light notebook; something with a bit more panache
Look for	A model that has an extra bay that would hold a CD/DVD-ROM, floppy drive, add-on battery or even a CD-RW drive. These generally will offer a 13/14-inch XGA display and weigh less than 3 kg	Something that gives you all the functionality of your existing desktop PC	Extremely lightweight devices that are different from the crowd
Our pick	ACi Ethos 4	ACi Emerald Pro	Toshiba Protégé 3500
Price range	Rs 1,00,000 and below	Rs 1,00,000 to Rs 1,50,000	About Rs 2,00,000

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Buying Tips for Laptops

■ **Battery Usage:** Before purchasing a portable laptop check the battery life. Be cautious as many manufacturers will indicate a battery usage time at the lowest possible power settings.

■ **Modem and Network Card:** If you use a dial-up Internet connection, ensure that a modem is included with the portable laptop. In addition, verify if the modem is an internal or PC-CARD (PCMCIA) modem, as you may require all the available PC-CARD slots in the future. PC-CARD modems are Type II; Network PC-CARDS are also Type II: if the laptop needs to be connected to a LAN, you need to ensure that it has a network card. Again, verify whether the card is integrated or PCMCIA.

■ **Documentation:** Although most manufacturers today tend to reduce the amount of documentation included with laptops, all laptop manufacturers will include some type of paper documentation or paper inserts. But check if this includes documentation on upgrading the laptop in the future, about connecting the required cables and how to use the bundled software.

■ **Refurbished Laptops:** 'Refurbished' is a term used to describe a laptop or a hardware device, that contains one or more component that's been used or repaired. Refurbished laptops will have a lower price and are generally a good deal for the budget-conscious.

■ **Software:** Does the software include Microsoft Office or Corel Suite? These packages allow you to have a word processor and/or a spreadsheet. For the

majority of all users this should be an important consideration. Are the software full-version or just demo programs and shareware?

■ **Legal software:** When purchasing a laptop, make sure it comes with legal software. Many end-users or small laptop companies who build or sell laptops may not provide you with legal copies of the software. Verify that the software that came with your laptop is on an original CD and has a software licence or registration number. An example of software that includes such certificates and/or licenses is Microsoft.

■ **Beware of Scams:** It's possible to overclock a processor, making it appear to be faster than it's rated for. To determine the processor speed, open the laptop and look at the processor itself. Do not look at the processor through a software program or through BIOS, as these values can be changed.

■ **Upgradability:** You may not consider this at first when purchasing a laptop, but it is important all the same. Here are some options to look for when upgrading the laptop: RAM, CPU, Hard Drive, etc. Are the upgrades something that you can do yourself, or does it require a visit to a service centre?

■ **Location:** Before you buy a laptop, make sure you can easily return it to the dealer if it proves unsatisfactory. Also check if the dealer can service your laptop. If not, where is the closest location where your laptop can be serviced?

Buying Tips for Handheld Devices

■ **Memory:** Depending on the types of applications you plan to use, a handheld's integrated memory could run out faster than you'd imagine. You will need at least 4 MB of memory for text-based applications, and 16 MB for storing media files.

■ **Compatibility:** Your handheld should support your applications. It should also be able to communicate with your desktop PC and preferably with other handheld devices.

■ **Expandability and upgradability:** Choose handhelds that allow the OS to be upgraded to higher versions. Also, look out for ones that allow the firmware to be upgraded through flashing.

■ **Screen size and resolution:** Monochrome screens are suitable for most applications; colour screens are for those who intend to work with graphics and video files. Look for a colour screen with good resolution, clarity and brightness, and one that is clearly legible in darkness as well as in bright light.

■ **Battery life:** Make sure it has a run time of at least 10 hours, or you'll find yourself spending a lot of money on batteries.

■ **Integrated features:** Opt for devices with additional features such as a cellular phone or camera only if you are going to actually use them. These frills add significantly to the cost.

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Power Tips for for using a Laptop Computer

■ **Laptops are Unergonomic:** Laptop design violates a basic ergonomic requirement for a computer, namely that the keyboard and screen should be separate. The reason is simple—in a fixed design, if the keyboard is in an optimal position for the user, the screen isn't and if the screen is, then the keyboard isn't. This means that you need to pay special attention to how you use your laptop because it can cause you problems. Consider purchasing a separate keyboard.

■ **Laptop Posture:** As indicated above, laptops violate basic ergonomic design requirements, so using a laptop is a trade-off between poor neck and head posture, and poor hand or wrist posture.

■ **Occasional Users:** Because the neck and head position is determined by the actions of large muscles, you are better off sacrificing neck posture rather than wrist posture. Find a comfortable chair, position your laptop on your lap and angle the

screen such that you can do not strain your body

■ **Full-time Users:** If you use your laptop at work as your main computer you should position this on your desk/work surface in front of you so that you can see the screen without bending your neck. Use a separate keyboard and mouse. Use the keyboard on a negative-tilt keyboard tray to ensure a wrist neutral posture. Use the mouse on an adjustable position mouse platform.

■ **Laptop Dimensions:** Many laptops offer large screens and can work as desktop replacements. The larger the screen the more difficult it will be to use this in mobile locations (e.g. airplane, car, train).

■ **Laptop Weight:** If you are a mobile professional, think about the weight of the system. By the word 'system' we mean the weight of the laptop plus all its accessories. Many lightweight portables can become as heavy as regular laptops when you add the weight of all of the components.



The Future of Laptops

PDAs will be capable of handling full motion (30 fps) video as easily as they would handle gaming and 3G communication. Devices such as the HP iPAQ H3950, Pocket LOOX 600, Toshiba Genio E550G and O2 XDA, based on newer processors such as Intel's XScale chips are enhancing mobile computing power.

The XScale processors are available in two variants—the PXA250 (400 MHz, 300 MHz and 200 MHz) and the PXA210 (200 MHz and 133 MHz). They consume up to one-third of the power of their predecessors, the Strong ARM processors. The PXA250 is aimed at handheld laptops, while the PXA210 is tailored for entry-level handhelds and cell phones. These processors also incorporate advanced power management features.

By integrating memory and LCD controllers onto the chip itself, they reduce the number of components in the handhelds they are used in. Both these processors come with 64 KB of cache and feature Intel's Integrated Performance Primitives (IPP), which provides in-built functions for signal processing (for speech and handwriting recognition), MP3 codecs,

MPEG-4 and H.263 video-conferencing codes. They also feature Windows CE .Net support.

Besides these processors, there are a slew of other devices, like the Handspring Treo 270 based on the 33 MHz Dragonball VZ processor, and the HP Jornada 928, based on the 133 MHz TI OMAP710 processor. All these enhancements indicate that the new super-breed of handhelds will enable users to run applications that were never thought possible, at speeds never experienced before.

As for future laptops, they will have faster microprocessors with more memory. The storage devices may change

from removable disks (Floppy, Zip, CD, and DVD) to solid state

memory, which could make them even lighter and thinner. While some models of laptops already have the ability to send and receive data using infrared and wireless Internet technologies, this feature may become more common.

In the more distant future, regular laptops may even eventually be replaced by wearable computers.



Buyer's Guide

MP3 PLAYERS



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When Sony first introduced its TPS-L2 personal audio in 1979, it created a sensation in the world of music. After some false starts, the name 'Walkman' was bestowed upon it, primarily because it was a cassette-based portable music device that could be easily carried with you wherever you go.

Over a decade later, Fraunhofer revolutionised the way music was recorded by developing the MP3 format. This not only reduced file sizes drastically but provided decent sound quality. The emergence of the Internet fuelled the success of this format because it allowed one to swap music files online, with ease.

The market for portable music players continued to be dominated by Walkman till a couple of years ago, but things are changing. The

technology employed in MP3 players has improved tremendously and we now get crisper sound, extended battery life because of the absence of moving parts in solid-state MP3 players and large storage space for songs.

Since MP3 players are portable devices, you'll need to keep a few things in mind while buying one. Ergonomics play as important a role in the buying decision as do features. Easy portability, convenient placement of buttons, and usability, are hot; bulky size, tiny buttons and menu navigation that needs a reference guide are not.

Buttons should be ideally on the front panel, and should be within easy reach. These days, MP3 players actually sport a whole range of new features, putting them into the category of hybrid devices rather than pure music players. Companies like Casio and Apacer have even built MP3 players into watches and USB drives.

The market is flooded with such devices, so it's critical for you to decide early on whether you want a plain-vanilla MP3 player, or a gizmo that comes with all the bells and whistles.

The menu structure should be simple and the functions accessible with minimal clicking. Some solid-state players don't come with an LCD screen—a basic requirement of any MP3 player. Turn a deaf ear to such obsolete players, which are still available in the market and sold to unwary buyers.

A robust earphone is important because it is the termination point in the audio chain. If it does not deliver good audio quality, the entire experience is lost. As far as portability is concerned, go in for smaller, lightweight devices.

Warranty is important in the case of portable devices, because they are going to be used while travelling or on the move. Chances of damage or malfunction are high, so the better the warranty the more faith you can rest in the brand. The same is true for after-sales support—the more outlets in a large number of cities and towns, the better.

Market Overview

Creative, Sony and Philips are some well-known brands available in the market, along with cheaper Chinese counterparts like the NAPA-DAV, which retails for under Rs 5,750. Solid-state MP3 players cost around Rs 8,000 to 15,000, depending on the memory and features offered (LCD screen, volume control on headphones etc). This is at least 5-7 times costlier than normal CD MP3 players that retail for as little as Rs 3,000. Solid-state MP3 players are more expensive than CD MP3 players because their storage media is more expensive.

Solid-state MP3 players have a memory limitation—they come with a memory card, which is a costly means of storage. CD MP3 players, on the other hand, offer very long playtime because a 700 MB CD, which is now available for as little as Rs 10, can easily store 100-125 songs of 6-7 minutes in length.

CD MP3 players are bulkier and much heavier than solid-state players. The fidelity they offer is also not as great as that of the solid-state players.



Buying tips for MP3 Player

You should check out the features first before buying any MP3 player. Given below are some features that you should look for:

- See if the player has support for more than one format, e.g. MP3 and WMA.
- The player should have a big enough LCD screen with backlit function, so you can read the information even in the dark.
- The buttons should be ideally placed so that if you have to operate a player that's buckled to your belt (or is in your pocket) you can do so without having to unbuckle or remove it.
- A rechargeable battery is a must, or the device will need frequent battery changes if used regularly.
- A sturdy carry case is very important, as any scratch or pressure on the LCD screen can harm this delicate device.
- Go in for a good set of earphones. The earphones need to reproduce sound faithfully.
- Make sure the MP3 player is covered under warranty for at least a year.
- The Line-out if present is definitely an added advantage as you can plug your MP3 Player to a music system.
- Upgradable memory is preferable to a fixed memory with no upgrade option.
- See that electronic shock protection of at least 100 seconds is provided with CD-MP3 player.



Also Remember...

- Some devices come with voice recording capability. This would allow you to use the player as a dictaphone.
- Built-in FM tuner is a useful feature on a long journey when you have had your fill of the songs stored in the player's memory.
- It is useful if the MP3 player can play back other file formats such as WMA.
- Make sure that you have the right port (parallel or USB) free on your PC.
- Encoding your music CDs into MP3s is a very CPU-intensive task. Make sure that you have a reasonably powerful processor (at least 400 MHz) on your PC. Otherwise it would take you quite a while to encode or transfer MP3s.

Shades of Music

When they first entered the Indian market, these devices were exorbitantly priced, but this scenario is changing. With the explosion in the number of such devices available abroad, a ripple effect is being seen here in the Indian markets, with prices dropping and greater variety available.

The most commonly available MP3 players are the solid-state devices with storage capacity beginning from 32 MB. There are two major Flash RAM standards in use today—Compact Flash and the newer Smart Media. Since memory is the most expensive component of an MP3 player, it has a major impact on the overall cost of the device. Popular brands in India include Creative and Diamond's Rio. The prices range from Rs 8,000 to Rs 25,000.



Technology Insight

Most devices use Flash RAM (minimum 32 MB) but some newer models can read MP3 CDs instead. A few products use a hard disk (6 GB for the Creative Jukebox) as their primary storage medium. Flash memory, however, completely eliminates skipping.

Smart Tips

LCD screen: A backlit display that allows you to view track and status information is very

useful. Most players have single or two-line displays but some (like the Lyra) feature a multi-line 16-character by 6-line dot matrix display capable of displaying ASCII characters.

Control and menu navigation keys: Similar to regular CD players, you have buttons for functions such as Play, Stop, Forward, Rewind, Search, Random, Programmable tracks, etc. Additional shortcut and navigation keys are a welcome addition.

Batteries: The digital signal processor forms the heart of the MP3 player and performs the task of decoding, processing and converting the MP3 data into audible audio format using a built-in codec.

File transfer Interface:

This is the medium for the transfer of MP3 files between the player and your PC. The most popular method is through a serial cable, which connects to your PC's parallel port. Newer devices use the hot-pluggable USB interface, which allows faster file transfers.

Memory expansion: You can buy add-on memory modules (Compact Flash cards or by Flash RAM) depending upon the standard supported by the device. Make sure that the player supports memory upgrades in case you decide you need it in the future.

Headphones: The headphones that come bundled with most MP3 players are usually of a low quality. If you are a music connoisseur you should look around for better-quality headphones from brands such as Sony, Sennheiser or Koss. Here again, make sure that you actually try out the headphones with the device before you actually put down the money for it.

	Easy listening	Music enthusiast
You need	Something you pick up while on the go	A player that you intend to live with and want your entire music collection accessible
Look for	A player that uses Flash RAM and has at least 64MB of memory with the option to upgrade	A player that uses either a hard-disk or CDs as the medium for storing music
Our pick	Apacer Audio Steno	Apple iPod
Price range	Up to Rs. 10,000	Up to Rs 30,000



Tips For using MP3 Players



Power is a serious issue with MP3 players as you seldom get the rated battery life. It's just like motorcycle manufacturers claiming incredible mileage for their motorbikes "under standard test conditions". To get the maximum out of the battery, try these techniques.

- Never set the volume level to maximum. This will protect not only the battery life but also your hearing.
- Use headphones that cover your ears completely rather than plugs, because the latter allows other noise into the ears and you will be tempted to increase the volume level.
- From the menu, reduce the time the backlit stays active. The feature is very helpful at night, but eats a lot of power.
- Organise your songs into playlists. For instance, put all rock music into one playlist and jazz into another. This will save you time, and you won't have to access the backlit option for long.
- Always use a good branded battery to avoid leaks that can damage components inside the player and render it unusable.



Since MP3 players are portable devices and are used on the move follow, these tips to ensure long, uninterrupted life.

- Always carry the MP3 player in its carry case.
- Avoid direct contact of other objects with the screen, as it may get scratched.
- Take care of the earphone cord. If it's stretched, it can leave one or both plugs useless.

More music please

Some solid-state MP3 players come with 32 MB or 64 MB memory and cannot store more than 6-12 songs encoded at 128 Kbps. However, you can increase the number of songs—but at the expense of quality. If the Kbps count is decreased to 64 Kbps or lower, the file size will reduce even further and allow you to store more songs. The quality of sound will not be as good as it is at 128 Kbps, and even playing at maximum volume might not be sufficient. To encode the music at a lower or higher bit rate, go to **Tools > Option** in Windows Media Player and click on Devices. Select MP3 player from the list and click Details. The new window will let you set the quality level by dragging the bar to the right or left.



Player On Four Wheels

Bored with the limited number of audio cassettes you have? Dismayed by the quality of music your car audio system plays? Here's a simple solution. If your car deck has a Line-in, most of the problems of connecting an MP3 player to your car deck is solved.

Get an RCA cable from the market, connect the red-connector and white-connector to the car deck, and the single pin connection to your MP3 player's headphone jack. The LCD on your car deck will display auxiliary-in or MP3, which means the MP3 player is successfully connected to the car audio system.

If your car's system doesn't have a Line-in function, you will have to buy a car MP3 adapter. This adapter looks exactly like a

cassette, with a connection port on one end where the stereo cable is connected. The other end goes in the headphone jack on your MP3 player.



The only trade-off is sound quality, which may not be as good as your car deck with Line-out, because there's a magnetic coupling inside your car deck between the cassette head and the car audio's head. This causes magnetic interference, which produces noise and hence loss in quality. But it's still much better than what you get from regular cassettes.

There are car MP3 players available in the market that are hard disk based, and which can be removed and plugged into a PC through a USB connection, but since their prices are very high they are yet to become popular.

Sound Formats

MP3

Because of its inherent versatility, portability and swap-value, the MP3 is most popular format by far. However, compared to newer formats, MP3 clearly shows up as inferior. It provides very decent sound quality at high bit rates, but the quality drops audibly at lower bit rates. This means you cannot hope to have small files with premium audio quality.

Ogg Vorbis

An open source music format, Ogg Vorbis has plug-ins for popular applications such as Winamp and Sonique. It supports multi-channel streams, so you can encode a surround sound recording, and not just 2-channel stereo. However, this format is popular only within the geek circles and open source zealots, much like MP3 in its early days. Ogg Vorbis offers better audio quality at smaller file sizes as compared to MP3.

This is the ideal format if you are developing an application—such as chat, game sound, etc.—that needs audio compression. Do remember that you need to pay to use this Codec in business applications. This format is most suited to small developers.



WMA

This is Microsoft's own audio format that is part of the Windows Media family of audio and video codecs. In its latest incarnation of WMA 9, the format offers audio quality superior to MP3 at comparable bit rates, and can do much better at smaller file sizes. Since it is the native format for Windows Media Player, it is conveniently accessible.

If you choose to encode your music to WMA 9, be sure to uncheck the option to 'Copy protect music', or you will not be able to play the encoded file on any other PC or device.

AAC

An encoding scheme owned by Dolby, this is the preferred codec for the highest quality compressed audio. At low bit rates, it out-performs all other known codecs. However, Dolby has been very slow with its licensing, hence there is a dearth of good encoding tools. If you do need to play AAC files, you can download the Winamp Plug-in from www.audiocoding.com.

Apple is using AAC in the newly launched iTunes online audio shop, and its iPod player is one of the early adopters of this format, though it is currently only supported on a Mac.

Future Of MP3 Players

The future holds a lot of promise for MP3 players. Today many of these players double as watches or storage devices. Even PDAs and cell phones ship with MP3 players!

One thing we'll certainly see is a tremendous increase in memory. Today, solid-state MP3 players are bundled with 128 MB, but with the introduction of the iPod from Apple (which has as much as 30 GB storage space), one will not need to load new music for awhile! This is just the beginning; in future we'll have MP3 players with as much as 40 to 60 GB storage that will connect wirelessly to your desktop to transfer music.

With the advent of wireless standards such as Bluetooth and widespread use of RF-based PC peripherals, soon there will be receivers bundled with MP3 players too to talk with PC using RF signals.

Manufacturers are also integrating support for other standards like Ogg Vorbis, WMA and AAC into one player. Formats like Ogg Vorbis are free and don't require

manufacturers to pay a licence fee. This format is a product of the open source movement and since it's as good in quality as the MP3 format, it's widely used online and has increasing support from media players like Winamp.



Designs will also change for the better. MP3 players of the future could be worn on the wrist. A more radical design revamp for the CD MP3 player involves the introduction of 8 cm CDs to replace the existing 12 cm CDs. This makes the players more compact, but play time is reduced by almost 50 per cent.

A new breed of players hitting the market—like the Creative MuVo—is the size of a finger but stores 128 MB of songs. It also works as a portable storage device. Other designs include a cassette that can be used as both MP3 player and cassette in a regular home audio system. In the not-too-distant future, don't be amazed to see an MP3 player integrated into your beloved's diamond ring!



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Buyer's Guide

MOBILE PHONES





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Also Remember...

- When you send a long message you charged for each 160 letters. Hence if you send a message which consists of 450 letters, you will be charged for three messages by your service provider.
- Tri-Band phones give you the convenience of talking in five continents. However, make sure your service provider has tie-up's internationally which will connect you international networks.
- While opting for a roaming scheme your service provider may not provide outgoing calls from all states.

A few years ago, a cellular phone was considered a luxury item. However, with tariffs going down, owning a cell phone has become a necessity. And most people do own one, right from your neighbour's school-going kid to your local *subziwallah*. In fact, things will soon reach a state where not having a cell phone is a sign that you've arrived—a subtle message that hints: "Look, I'm far too important to be at your beck and call all the time!"

Joking apart, a cellular phone today is more than just a phone. It allows you to store applications, manage meetings, appointments, etc. More over, newer phones come with a built-in camera, giving the PDA market a run for its money. Cellular handset manufacturers have been flooding the market with new models, and this can only make your buying decision more complicated.

So which is the right phone for you? If you wish to use the phone simply for messaging and receiving calls, you can get a good deal for Rs 5,000. However, if you're looking at features such as calendar, PC synchronisation, Bluetooth connectivity, voice recorder, WAP browser etc, you could end up paying anywhere from Rs 10,000 to Rs 16,000. Phones bundled with a camera and multimedia messaging could set you back by Rs 20,000 to Rs 40,000.

Market Overview

With the market growing, even Indian brands such as VKMunoth have made an appearance,

and depending on their success, more will follow. The entry-level price of a cell phone has dropped around 15 to 25 per cent over the past year, and basic phones such as the Nokia 3315, Sony Ericsson T100, T200 now cost between Rs 4,800 and Rs 5,800.

In the mid-range segment, which has some additional features such as calendaring, large capacity address book, larger screens, IrDA ports and so on, prices hover between Rs 10,000 and Rs 20,000. This is also the largest category of cellular phones. Phones such as the Nokia 6310, and 8310i are among the more popular models. On the other hand, Sony Ericsson's T68i does not have many buyers despite a relatively low price of around Rs 15,000. This is because there's very little awareness among users, even though the phone has been available for more than a year.

In the high-end segment, Nokia's 3650 with a built-in camera is the latest craze. In the premium segment the latest entrant from Sony Ericsson is the P800. Sold at around Rs 40,000, this comes with plenty of features to justify the price tag.

Prices in India are still on the higher side when compared with international markets, at least in the premium segment. Hence a lot of models get smuggled into the country through grey channels, and are available at lower rates. But with the industry maturing, this price difference has decreased, especially in the entry-level and mid-range segments.

Market Scenario

The 'wired' society is giving way to one that is wireless. Computing is getting legs, with people increasingly accessing the Internet and communicating with each other via small, hand-held electronic devices such as cell phones and personal digital assistants (PDAs). Freed from the plug, these

devices provide access to information anytime, anywhere.

Prices for entry-level cellphones begin from about Rs 4,000 and go up to about Rs 40,000. Most users however will probably find a suitable cellphone for less than Rs 10,000.

Decision Maker			
	Basic use	Amateur enthusiast	Performance Seeker
You need	Average looks with basic features	Sleek looks with PC connectivity	Camera, PDA, Tri-band, external Memory module support
Look for	A phone that gives 100 or more phone book entries	Phone book with a storage capacity of 500 names and 150 SMS, GPRS, infrared or Bluetooth connectivity	Camera supporting a resolution of 640 x 480, loads of internal memory, fast CPU.
Our pick	Nokia 2100	Sony Ericsson T68i, Nokia 6310i	Nokia 3650, Sony Ericsson P-800
Price range	Up to Rs 7,000	Up to Rs 15,000	Up to Rs 40,000



Buying tips

■ **Budget:** The market is flooded with all sorts of mobile phones. You may be lured to buy a more expensive phone than you can afford, but resist the temptation!

■ **Talk-time:** You should always check the talk-time of the cellular phone before making a purchase. Most mobile manufacturers specify this on the packaging box.

■ **Battery type:** There are three types of batteries available in the Indian market: Lithium Polymer, Lithium-ion and Nickel Metal Hydride. While buying a new phone it's advisable to buy a phone with a Lithium Polymer battery, as it's slimmer and has a larger power capacity. Nickel Metal Hydride batteries are heavier and have less power capacity.

■ **Phone size:** It is advisable to go in for a medium-sized phone that can easily fit into your pocket. It's easier to hold and use such phones than the newer tinier models, even if the latter look more appealing.

■ **Scheduling:** Most phones give you the functionality of a calendar and task options, which allow you to create daily schedules. However, the calendar could prove inconvenient if you're not provided with a monthly view.

■ **Internal memory:** Some basic phones do not give you any sort of internal phonebook memory. High-end phones provide fixed allocated memory ranging from 300 to 500 contacts, and also give you the flexibility of adding multiple entries for each contact. Hence, before buying a phone, take a look at the amount of internal phone memory that it ships with.

■ **Colour display:** If your budget permits, buy a phone that provides a colour display—the prices of these phones, such as the Nokia 3530, are coming down. You get phones that have an 8-bit colour display—Panasonic has just released a cell phone with a 16-bit display—but it's advisable to go in for at least a 12-bit display to ensure crisp quality.

■ **Tri-band or dual-band:** While buying a phone, check if it supports dual-band and preferably triband, which ensures that you can use the phone globally.

■ **Enhanced Full Rate Speech (EFR):**

Make sure your phone supports EFR as this codec helps in reducing the amount of background noise that gets transmitted along with your voice.

■ **General Packet Radio Service**

(GPRS): If you're a power user who wants to surf the Web, and access e-mail, you could go in for a phone that supports WAP over GPRS. This will allow you to be continuously connected to higher capacity Internet-based services.

■ **Infra-red port:** Most new phones give you a plethora of connectivity options. Phones having an Infrared option allow wireless connections

between the computer and the mobile phone devices. You can use IR to send and receive phone book entries (business cards) and reminder notes.

■ **Bluetooth:** This is the wireless standard of the future, and provides a very user friendly way to transmit data at high speeds, over short distances. If your phone supports Bluetooth, you're all set for the future.

■ **Internal antenna:** This feature allows you fit the phone in the pocket as the phone size is compact. Most current cell phones have this feature.

■ **Vibrating alert:** This feature allows you to make the phone vibrate when a call, or a message is received. It's useful when you can't keep the ringer on, such as in a theatre, or at an important conference.

■ **Multimedia Messaging Service (MMS):** Most high end phones have this feature that allows you to send and receive rich media messages (comprising text, sounds, images and video). However, most phones have a size restriction per message or they don't allow you to forward audio. Before buying a MMS-enabled phone, make sure you take into consideration the file size, restriction and its capability to send audio.

■ **Concatenated messages and character support:** The GSM standard restricts you to messages containing only 160 characters, so a phone that supports concatenated messages could enable you to send longer messages easily. Blinking messages can't be displayed on all phones. Phones having support for 'Unicode' will allow you to display blinking messages.

■ **Voice dial:** A voice recognition system that allows you to dial a telephone number stored in your phone memory by just saying the person's name. Voice dial is very convenient and fast, and useful in places where you cannot see the keypad or when your hands aren't free. Most new Nokia phones lack this feature, so don't take it for granted that a new cell phone will come with voice dial.

■ **Accessories:** Most expensive phones bundle quite a few accessories in the form of communication cable, desktop charger, leather case etc. If your phone gives you such freebies, you can save money by not having to buy them separately.

■ **Support service:** What happens when your phone breaks down—does the warranty cover all the critical parts such as circuit board, screen, software installation and BIOS? Check this while buying the phone.

■ **External memory support:** Most new phones give you the flexibility of adding external memory modules, which allow you to add more data. If you're buying a high-end phone, it's advisable to buy one that supports external memory.

■ **Battery life:** Most manufacturers claim to have a 15 day standby time, however these are under test conditions in analogue mode. Hence if your buying decision is solely based on this then you need to reconsider it.

■ **Weight:** The weight mentioned by the manufacturer could be without the battery. Hence this could be misleading. Always install the battery and check if you are comfortable with the weight.



Accessories

Cell phones are no longer just communication devices; they reflect one's lifestyle and attitude, and this leaves a lot of space for customisation options such as add-on kits and other accessories. These accessories can be lifestyle-defining or they could simply enhance and simplify the overall cell phone experience.

These accessories can be classified into functional (those that improve the usability) and the non-functional (those that improve the aesthetics). Among the functional accessories we have various options such as headsets, music stands, music players, external video cameras, desktop chargers and batteries.

Headsets have been around for quite a while. They allow you to receive and make calls without your having to bring the phone near your ear. Just plug the earpiece in your ear, and your hands are free to do whatever mischief they're up to at the moment!

For business users who are always on the move, long battery life is always an advantage. But having a spare battery is equally good. Nearly all manufacturers today provide spare batteries and a desktop charger to charge them. Nokia even provides dif-

ferent types of chargers. The ACP 12E is the best of the lot—it reduces charging time by half.

You also get MP3 and FM radio sets that plug into your phone, and let you listen to music on the go. Nokia has an add-on MP3 adapter for most of its phones, whereas Sony Ericsson offers an FM radio kit for some of its models. Nokia has recently introduced its 'Music Stand', an audio device that sits on the desktop and lets you play music via built-in speakers.

With the advent of MMS and due support from service providers, manufacturers such as Nokia, Sony Ericsson, Motorola and Panasonic have introduced external cameras for some of their models. These plug into a port and let you use your cell phone for some decent—if clandestine—photography.

Apart from such functional accessories that make your life simpler and more organised, phone makers also offer colourful changeable covers for nearly all models. All Nokia models support this feature, and other manufacturers have introduced such features in their latest models. Some high-end models even sport an elegant leather carry case.



Power Tips

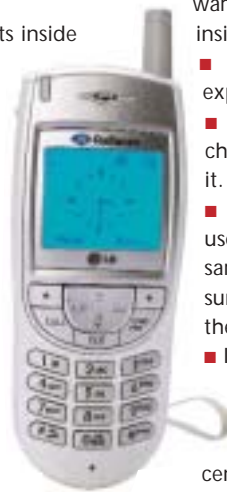
Phone Care

You just spend your hard earned money buying an expensive mobile phone, so make sure you keep the following points in your mind while handling them else you could end up damaging it in the long run.

- Never keep your cell phone near heat and magnetic sources (gas stove, direct sunlight, audio speakers, etc).
- Avoid dropping it as it could damage the delicate circuits inside the phone. Use a wrist strap or a belt clip. Covering your phone (and possibly making it look less attractive) is a more prudent choice than damaging it by dropping it.
- Switch the device off if it's not going to be used for a long period of time. If you do not tend to use your mobile phone for a long time, then remove the battery and put in a dry and a cool place.
- Keep the device away from moisture and liquids. Avoid taking the phone into areas like kitchens or washrooms. Avoid storing or using it in dusty, dirty areas as its moving parts can be damaged.
- While charging the device, do not pull the adapter cord out from the device until the main electricity supply is switched off.
- Switch off the phone before removing the battery or changing your SIM card.
- Use only approved accessories and batteries. Do not connect incompatible products. Always use the rated and factory specified accessories for your phone. If, for example, you use a higher power rating for charging your phone, it could get charged faster but will lower the life of the battery or even damage the phone.
- Ensure you keep your mobile and its accessories out of the reach

of children.

- Never forget your cell phone in your vehicle—apart from the fear of being stolen, the heat could shorten the life of electronic devices, damage batteries and melt certain plastic components. Similarly, do not store your phone in cold areas because when the phone warms up to its normal temperature, moisture can form inside it, which may damage the electronic circuit boards.
- Never attempt to open the phone yourself, as non-expert handling of the device may damage it.
- If you wish to clean your cell phones, do not use harsh chemicals, cleaning solvents, or strong detergents to clean it. Just take a soft moistened cloth to wipe off the dirt.
- A new battery usually lasts for two years provided you use it in the right way. Never recharge a battery unnecessarily, this in effect reduces the charge cycle. Always make sure you use the specified charger, else even this will affect the battery performance.
- In a country such as India, where temperature and humidity levels are high your phone may stop functioning in extreme cases. If this happens do not try to open the phone yourself instead give to the authorised service centre and they will do the needful.



Health and Safety Tips

- Never use your phone while driving. It may not be a punishable offence in many states, but you could cause an accident.
- As an alternative, you could use one of the many hands-free accessories available today, but be aware that using these while driving could also be an offence.

- Avoid taking a call while crossing the road, as your attention could be diverted, and you may stray into the path of oncoming traffic—stand on the pavement if you receive a call.
- Always buy a cell phone that's SAR-approved. This ensures that the radiations emitted are minimal.

The Future of the Cell Phones



Five years ago, mobile phones were only for the wealthy, who could afford their fat price tags. However, now there seem to be more mobile phones than households in metro cities of India, and the numbers are growing. We have already approached the time when it will be considered unusual not to have a mobile phone. Projections suggest that the majority of voice calls will be mobile-to-mobile in the near future, due to low tariffs. Fixed lines will mostly be used for data connections.

All this depends, of course on pricing. GPRS is booming on various service providers, and the cost of calling a mobile phone from a fixed phone is becoming expensive. SMS text messaging—and now MMS—have become the communication medium of choice for many in their teens and twenties, despite the relatively high cost. In fact, this is the only really new form of communication to have emerged in decades.

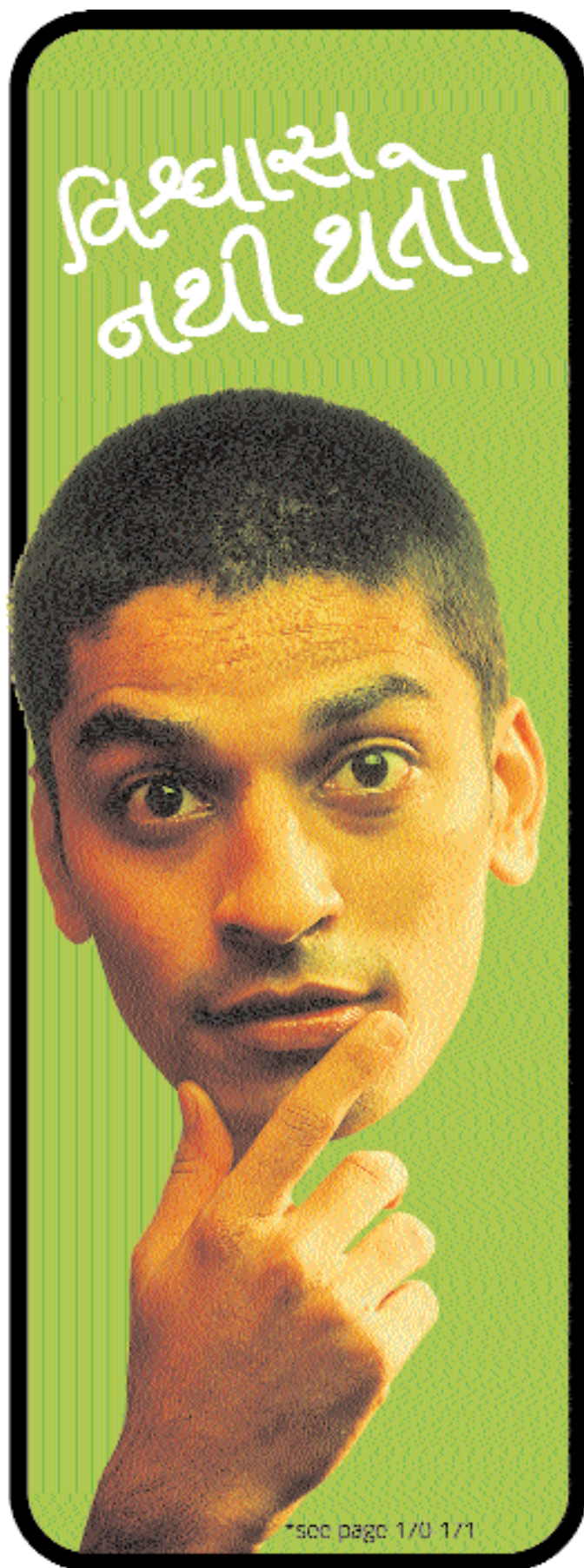


Mobile phones are evolving fast. Today's latest handset model is new for just a few weeks, and obsolete in a few months. And network technologies are moving just as fast.

We can soon see 'third generation' (3G) frequency networks that will offer much faster data access and more capacity. It's likely that this trend will displace many fixed-line phones. However, the huge price paid for the licenses suggests that these facilities won't come cheap.

Another interesting thing that one might see soon in the mobile phone market is disposable cell phones. Randi Altschul from New Jersey will soon provide the world with her unique concept of disposable cell phones. The phone will be extremely small (about the thickness of three credit cards) and extremely lightweight. Better still is the price; the phones are expected to sell for under \$20, which will include 60 prepaid minutes of calling time.

This Phone Card Phone can make outgoing calls only; the consumer will be able to add phone minutes with their credit or debit cards until the non-replaceable battery dies. A large part of this phone will be made out of paper products that can be colourfully printed with images and advertisements, which would make them great give-away items for company promotions.



Buyer's Guide

DIGITAL CAMERAS





Photographs are not just bits of paper; they're priceless memories. But prints fade with time. Now you could convert your images to digital format by scanning them, and store them on your PC. This is one method of storing images, still widely used.

Digital cameras, on the other hand, capture information and transfer data in digital formats such as JPEG, TIFF and so on. It took a while for digital cameras to gain mass acceptance though, because of their high cost—and the fact that you needed a computer to transfer the data.

As PC penetration increased, so did the usage of such devices as digital cameras. This has motivated manufacturers to bring out better digital cameras loaded with the best features. Indeed, these cameras have improved tremendously in past two years. The resolution has skyrocketed, the feature list now includes high-end, professional features such as 1/10,000 shutter speed, white balance modes and 10X optical zoom for landscape and outdoor photography.

People who used point-and-shoot cameras

all their life and who had never heard of terms such as macro-mode or sepia, now talk in a language that makes even professionals look up and take notice. That's largely due to the proliferation of digital cameras and the features that come with them.

The charge coupled device or CCD, which replaces the film in a digital camera, has also witnessed tremendous refinement. From a VGA camera, to 5.0 effective megapixels packed in the same device is a huge leap. LCD screens used in such cameras have changed too—from dark screens that needed to be held in front of the eye to the vividly colourful, crystal-clear LCD screens of today. Lack of storage space used to be an issue, because early digital cameras couldn't store many images, but now memory expansion slots let users add memory at will.

Another major boost is now coming from printer manufacturers, who are designing their printers to either directly read the removable memory storage and print, or plug the camera directly for photo printing. This bypasses the computer completely.

With a further drop in prices, digital cameras are going to be as common as the television in the not-so-distant future. Even now, there are hundreds of thousands of digital cameras around us, and this number can only increase as better technology arrives, along with more affordable prices.

Tricks to be a Sharp Shooter

- Brace yourself and avoid excessive hand movement to get those sharp photos. The camera needs to be stable to get a good focus, and adjust the white balance and metering.
- Use the flash wisely. In bright sunlight, where parts of your subject might be darker, use 'flash fill' to brighten up the darker areas for a balanced photo.
- Flashes only have a range of up to 10 to 12 feet so don't bother using it for objects farther than this. Use red-eye reduction to get rid of the monster-glow eyes.
- The overall tone of a photo looks different in certain kinds of lighting. Experiment with the white balance and if you want more natural colours, manually set the white balance to match the scene before you shoot.
- For portrait shots, avoid a crowded background, as this tends to take away the attention from the subject. Either move to a more neutral background or adjust the f-stop to the widest setting possible so that the background is as out of focus as possible—this creates clarity for the main subject.
- Use the Flash-fill mode, especially when shooting portraits as this eliminates harsh shadows on the subject. Avoid such shots at high-noon as this creates very harsh shadows.
- Flash reflectors are great for filling out harsh shadows. You can use a simple car window reflector as a flash reflector or even a large white board. Reflect light on the subject's face to eliminate shadows and you will have great portraits.
- If you are going to use your digital camera for outdoor shoots, use a neck strap as this is a very delicate device and you may drop it accidentally, resulting in considerable damage.
- Always keep in mind while taking a snap that you should not focus on very bright, or very dark areas. Instead, keep the focus on neutral areas where lighting conditions are not extreme.
- If you are shooting, say, a building with the bright sky in the background, keep rest of the settings such as the white balance to auto and increase exposure by one point. In the image the building will retain all the details but the sky will look less bright.
- While taking close-up photographs, always turn on the macro mode. This is the minimum range at which the camera can take a photograph of the target.

Market overview

So far, there was no proper channel in the market to buy digital cameras from. Buying cameras from the grey market was a risky proposition because they cost only marginally less and came with no guarantee. But now most companies—such as Canon and Sony—have a presence, and offer ample after-sales support and service.

Keeping pace with technology, the digital camera has also moved up the ladder, at the same time witnessed a drop in price. Now a regular 2 megapixel camera can be bought for as little as Rs 15,000 to 18,000. And a 5.0 megapixel camera with 3X optical zoom can be yours for Rs 50,000.

There are also cheap alternatives such as the BenQ 1300, which captures images at 1.3 megapixel, and costs around Rs 10,000. Other players such as Creative and Logitech have something to offer too, if you're looking at VGA (640 x 480) cameras. These offer basic features such as macro mode and shutter mode, and also let you record small movie clips.

Vendors that traditionally manufactured film-based cameras, such as Kodak, Nikon and Olympus, now have a complete range of digital cameras on offer.

Also Remember...

- Memory upgrades are available in the form of a Compact Flash card, Smart Media or Sony's memory stick. Some cameras don't allow upgrading, which is a severe limitation.
- Optical zooming is all that counts; Don't take the electronic zoom function too seriously.
- Floppies for storage aren't a great idea because they tend to be very unreliable, not to mention the limited capacity.
- Look for features such as printing directly from the camera through a special cable, taking sepia photographs, setting the shutter speed, selecting macro modes, auto focus, etc. Some cameras even let you capture short video clips.

Trigger Happy

As little as two years ago, anyone buying a digital camera would have had to put down as much as Rs 50,000 for a VGA camera with just 2 or 4 MB of storage space. These early models were very inefficient in power usage. Other features such as zooming, which are common in regular cameras, were also missing. However, in the current market, most mainstream cameras give you mega-pixel resolution (more than 1 million pixels), better battery life and even optical zoom lenses, all for as little as Rs 10,000 to Rs 15,000.

Technology Insight

Digital cameras use either a CCD or CMOS sensor, which captures light and converts it into an electrical charge to capture an image. CCD sensors lead to higher quality images. The size of a CCD sensor is approximately 4.4 mm x 6.6 mm as against the 24 mm x 36 mm size of the regular film.

Jargon Buster

Resolution: This is often expressed in megapixels. For example, 2.1 megapixels cor-



responds to about 1,600 pixels x 1,200 pixels.

Memory: Since cameras come with limited built-in memory (between 8 to 16 MB), this becomes a limitation when you are taking photos at higher resolution settings. At a resolution of 1,600 x 1,200, you'd be able to store just a few images in the TIFF format.

Interface: Connection to the computer is through USB or parallel port. The USB interface is preferable due to greater convenience and higher data rates.

Power: You will need a set of rechargeable batteries because the consumption tends to be high, especially when you are using the LCD viewfinder. Some manufacturers ship their cameras with power adapters, which is pretty useful when you are shooting indoors.

Separate monochrome display: It makes sense to have a separate monochrome display for camera status when you are trying to conserve battery life by switching off the LCD screen.

Viewfinder: Some cameras have a regular viewfinder in addition to the small LCD screen that also serves the purpose of power saving.



Decision Maker

	Casual user	Photography enthusiast	Professional
You need	To be able to take photos to compile personal albums or publish to the Web	High-quality images with plenty of configurability	Very high quality photographs with all the knobs and switches, plus expandability
Look for	Between 640 x 480 and 1,024 x 768 resolution and 2 MB memory; maybe one that doubles as a Web cam	1,280 x 1,024 resolution with at least 2X optical zoom and 8 MB storage	2,048 x 2,048 or higher with special lens options and a minimum 16 MB memory
Our pick	Logitech Click Smart 510	Fuji FinePix 2,800 Zoom, Nikon COOLPIX 775	Olympus C-5050ZOOM
Price range	Around Rs 10,000	Up to Rs 30,000	Up to Rs 60,000

Power Tips

■ Almost all digital cameras come with an automatic adjustable zoom lens, which you can also adjust manually. If you have kept it to auto, press the shutter button halfway, then press it completely to take the picture. This will adjust the focus of the lens, and give you sharp focused results.

■ To allow your LCD screen to consume less power, always keep the powersave mode on. Almost all cameras have an LCD-off option, which can be used to save power.

■ If the camera comes with a power adapter, keep it connected to the device while transferring images to a PC, especially a camera with the RS-232 (serial) connection which has very slow transfer rate.



■ While choosing a camera don't only go for the features; but also look for its ergonomics. While taking snaps, see that the button is within reach of your fingers, and that your fingers do not come in the way of the lens or flash.

■ Never keep the resolution to the maximum, if you are only going to view it on the PC screen. For such

photographs 1,024 x 768 is the ideal resolution.

■ Always remove the batteries if you are not going to use the camera for a while, because batteries can leak and damage the camera.

■ When on the road, remember to carry many sets of batteries or invest in rechargeable ones—digital cameras have a way of chewing through batteries and you wouldn't want to miss a great photo opportunity.



Digital camera vs Web camera

■ Web cams usually don't feature resolutions over 640 x 480 if you use them for taking snaps, whereas digital cameras can easily provide a resolution of 1280 x 960 pixels.

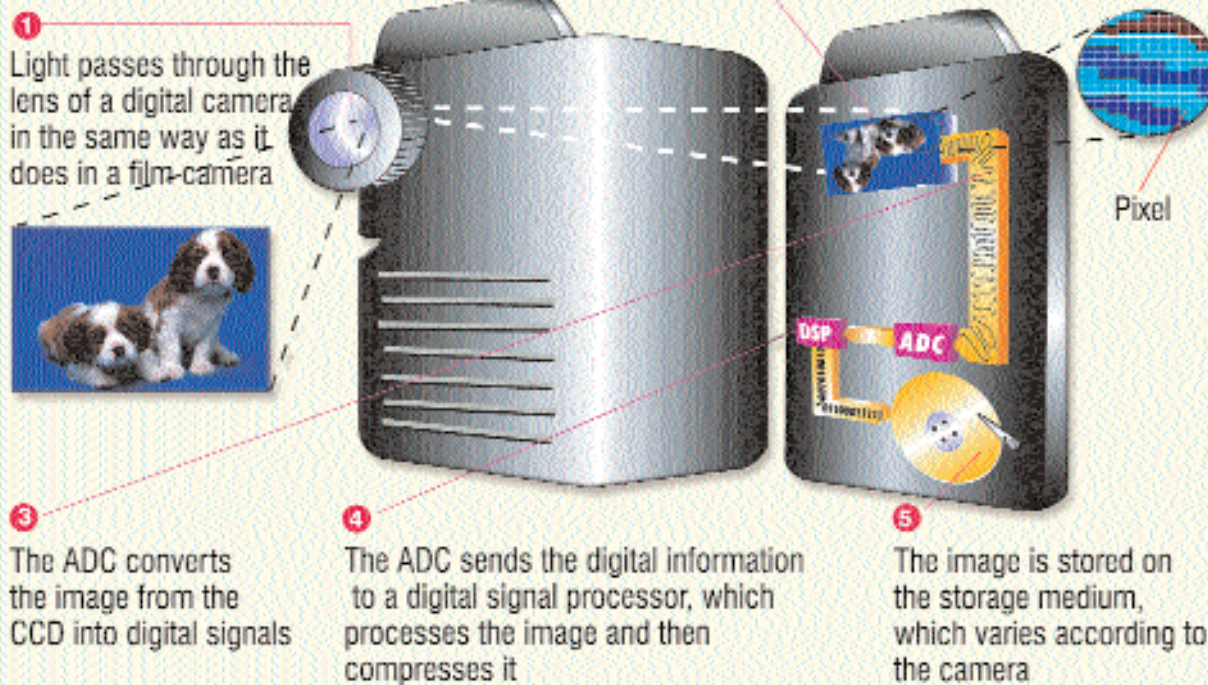
■ A Web cam cannot take pictures when not connected to a PC since it draws power from the interface cable. Digital cameras, on the other hand, have their own power source and are capable of taking photographs—and even recording small video clips.

■ Some high-end cameras come with a built-in microphone to record audio while recording the video clip, whereas Web cams need a microphone connected to the PC separately to record audio.

■ Digital cameras have adjustable focal length, which is not the case with Web cams.

Under the bonnet of a Digital Cameras

HOW A DIGITAL CAMERA WORKS



The Future of the Digital Camera



A few years ago, digital cameras were costly and rare gadgets. They had CMOS sensors that were almost as costly as a lens, and were capable of clicking images at not more 640 x 480 pixels. But in the last 2 to 3 years, the technology has advanced immensely. From a meagre 8 MB storage, some cameras now boast as much as 64 MB memory. Almost all of them support external memory cards, and can be plugged directly into a compatible photo printer that will print you photographs of excellent quality.

Earlier digital cameras lacked good image quality. This issue was resolved by replacing the CMOS with a CCD (charge coupled device). The CCD allows cameras to capture images at 10 megapixels. Cameras today are equipped with 10X zoom lens and can take even external SLR (Single Lens Reflex) lenses to make things better for professional users. In fact, newer digital cameras have all the features a professional would require.

The best part is that manufacturers can include as many feature as they wish because of the hardware and software combination. The normal 2 to 3 megapixel cameras have white balance settings, macro mode, red-eye reduction, video-clip recording, and 2X to 3X optical and up to 6X digital zoom. These features help even novices to capture brilliant images.

The wide acceptance of digital cameras and the ready availability of software to modify captured images have prompted newer operating systems such as Windows XP to bundle built-in driver support, making the devices virtually plug-and-play.

There are a few features found only in high-end cameras, which will surely be implemented in entry-level cameras soon. This includes TruePic technology from Olympus, which uses all the pixels even at lower resolutions. The software or algorithm has been written to enlarge the image even when it is in RAW format on the camera, to get a higher interpolated resolution than what's available with current cameras. This will reduce the artifacting that occurs while enlarging photos using image-editing software.

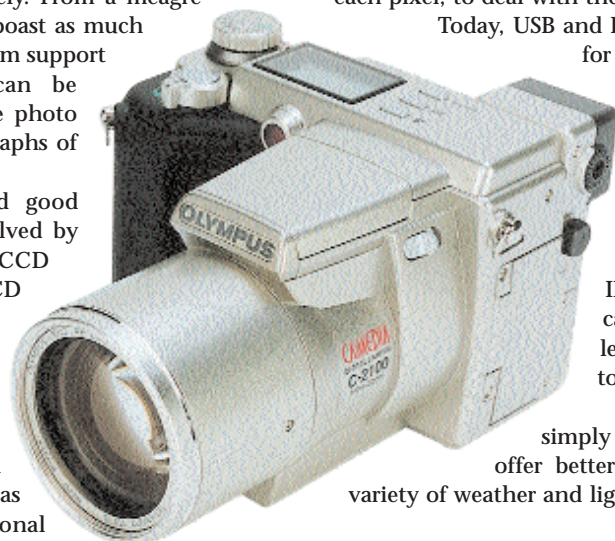
Future cameras will also have the lenses specifically designed to suit digital cameras. This is necessary because as the CCD count goes up, the density increases manifold. Even cameras equipped with the best CCD might not produce a great image if the lenses do not let the CCD see through it precisely when zooming in or out.

CCDs used in digital cameras have one very visible shortcoming as compared to film. Because of the way they function, CCDs cannot respond to the dynamic range—the range of light and dark values that can be recorded. Since CCDs are linear devices, the limit within which they can respond to the dynamic range is predefined: once they are fully charged they will not respond to any incremental exposure. Film is

more flexible in this regard and hence produces better results. But a new technology from Fuji promises to eliminate this problem. This is achieved by putting in one more low-sensitivity sensor to each pixel, to deal with the change in exposure levels.

Today, USB and FireWire are the interfaces of choice for most digital cameras. But as devices from laptops to PDAs, and even cell phones embrace wireless connectivity to 'talk' with the PC and other mobile devices, the digital camera will surely follow suit. Some gadgets such as the Casio wrist camera already have an IR port. And cell phones that have a camera also come with an IR port to let users download pictures wirelessly to their PC.

Digital cameras of the future won't simply be more feature-rich, they will also offer better photo quality and function in a variety of weather and lighting conditions.



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A-List Reviews

A listing of the best products in different hardware and software categories

Every Digit reader must surely be aware of the various comparison tests we do at our Digital Test and Research Centre. The comparison includes various products from all categories. They range from motherboards to keyboards, and other cool gadgets such as digital cameras and MP3 players. We grade these products based on their performance, features and their

merit as per the money you pay for it. The 'A' listed products are those which are truly the best among the best. What we are giving here are products, that you can safely bet on. When you buy one such product you can be absolutely sure that it will perform up to the mark you expect. Read on to find out more about the product you have been hunting for all this time.

CPU

Intel Pentium 4 3.06 GHz

HyperThreading finally becomes a reality for the desktop PC with Intel's Pentium 4 3.06 GHz processor, which truly impresses with its performance.



This is as fast as you can get!

Pentium IV 3.06 GHz B+	
Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: 3.06 GHz clock speed, 512 KB on chip cache, Northwood (0.13 micron)
Price: Rs 37,000 **Contact:** Nebula Technologies
Phone: 044-22323715 **Email:** pratik@nebulatech.com
Web site: www.intel.com

AMD XP 1700+

The AMD Athlon XP 1700+ takes the crown for the best value processor. As far as performance goes, this one delivers on all fronts. It was able to beat all its competitors with its price to performance ratio.

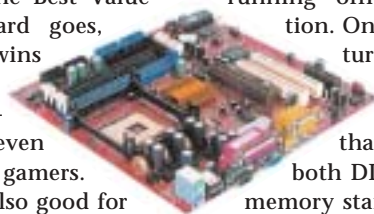
AMD XP 1700+ B-	
Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: 256 KB L2 cache, 133 MHz FSB, Thoroughbred core
Price: Rs 4,250 **Contact:** AMD Far East Ltd **Phone:** 011-26238620
E-mail: amd@surfgold.com **Web site:** www.amd.com

MOTHERBOARD

Mercury KOB650GL NDSMx

As far as the Best Value motherboard goes, this product wins hands down; it is an outstanding buy even for hardcore gamers. The board is also good for



running office application. One of the features you may find handy is that it supports both DDR and SDR memory standards. The

board features onboard graphics but does not leave out the AGP 4X port either. Overall, its low price makes it a great buy.

Mercury KOB650GL NDSMx B+	
Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: SiS650 chipset, DDR and SDRAM support, onboard sound, onboard Ethernet, 4X AGP, 2 PCI slots, native USB 2.0 support
Price: Rs 3,300 **Contact:** Kobian India Ltd **Phone:** 080-5566626
E-mail: rohit@kobian.com **Web site:** www.kobian.com

MSI 845PE Max2

This motherboard features a DDR 333 solution based on Intel's latest 845PE chipset, which supports Intel's HyperThreading technology. It's a nice little board that provides great features and good speeds to boot.

MSI 845PE Max2 B+	
Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: 845 PE chipset with HyperThreading technology, DDR 333 support, onboard AC'97 5.1 channel support, IEEE 1394, Gigabit Ethernet, Promise RAID controller, 4X AGP, 6 PCI slots, 1 CNR slot, USB 2.0 module
Price: Rs 9,000 **Contact:** Priya Ltd **Phone:** 022-22663611
E-mail: salesbom@priyagroup.com **Web site:** www.priyagroup.com

MSI KT4 Ultra

This latest motherboard from MSI is built around the KT400 chipset for the fastest AMD processors. The Athlon XP, when paired with this motherboard, zooms past the Pentium 4 2.8 GHz. It's recommended for performance enthusiasts.

MSI KT4 Ultra B+	
Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: KT400 Northbridge, VT8235 Southbridge, Bus Speed: 200/266MHz, Memory Support 3 184-pin DDR SDRAMs (Up to 3GB), 6-PCI bus slots (support 3.3v/5v PCI bus interface), 6 USB 2.0 ports (4 Rear/ 2 Front), Serial ATA Interface (Optional)
Price: Rs 7,850 **Contact:** Priya Ltd **Phone:** 022-22663611
E-Mail: salesbom@priyagroup.com **Web site:** www.msi.com.tw

ASUS A7S266

This board is a good buy for the office, where Word, Excel and PowerPoint are used far more frequently than graphics-heavy applications. The performance is decent; gaming tests prove that you can run *Quake III Arena* at a playable frame rate.

With a price tag of just Rs 5,000, it is essentially, a low-cost and feature-rich motherboard for the AMD platform.

ASUS A7S266	B+
Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: SIS 740 chipset supporting up to Athlon XP 2600+, DDR and SDRAM support up to 2 GB, onboard sound, onboard LAN, 4X onboard video, 4 PCI slots, USB 2.0

Price: Rs 3,950 **Contact:** Neoteric Infomatique

Phone: 022-24172600 **E-mail:** sales@neoteric-info.com

Web site: www.asus.com

DISPLAY

Samsung SyncMaster 171MP

This one is a masterpiece. Unfortunately, if gaming is what gets you going, this one's

not for you. It's capable of displaying images at 1,280 x 1,024 pixels. This LCD monitor is also able to deliver clear and sharp images, thanks to its 0.26 x 0.26 mm pixel size. It has built-in speakers, which deliver passable sound quality. Overall, this LCD combines good looks with performance.



Samsung SyncMaster 171MP	A
Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: 1,280 x 1,024 at 75 Hz pixel resolution, 250 cd/m² luminance, 0.26H x 0.26 V pixel size, 8.5 Kg

Price: Rs 75,000 **Contact:** Samsung Electronics

Phone: 011-51511234 **E-mail:** marketing@samsungindia.com

Web site: www.samsungindia.com

Philips 150MT

The Philips 150MT is a slim LCD monitor sporting a two-tone colour scheme. The monitor has built-in speakers that save space, but thier quality is, at best, average.

The 150MT provides an array of ports for connecting a DVD player, a video CD player and a VCR. It also has a TV coaxial-in port and includes a PiP feature. It ensures sharp and

1/2 pg V AD

clear images, making movie-watching a joy. Since this LCD monitor has a native support of 1,280 x 1,024 pixel resolution, professionals will find it worth the price.

Specifications: 1,024x768 @ 75 Hz pixel resolution, 250 cd/m² luminance, 0.3 H x 0.3 pixel size, 5.8 Kg
Price Rs 49,999 **Contact:** Philips India Ltd **Phone:** 022-56912353
E-mail: sanjay.maheshwari@philips.com **Web site:** www.philips.com

Philips 150MT	A-
Performance	▶▶▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶▶▶
Features	▶▶▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶▶▶

PRINTERS

Canon LBP 1120

The LBP 1120 is an entry-level printer from Canon that offers the best in its class. This good-looking printer offers many features. The printer exhibited superb performance when it comes to printing both text and images. The Canon LBP1120 offers superior print quality at good

speeds—and at a very decent price.

Canon LBP 1120	B+
Performance	▶▶▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶▶▶
Features	▶▶▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶▶▶

Specifications: USB and Parallel interfaces, 1200 dpi, 512 KB buffer memory, 250-sheet paper tray
Price: Rs 16,995 **Contact:** Canon India Ltd **Phone:** 011-26806572
E-mail: brijesh@canon.co.in **Web site:** www.canon.co.in

Wipro Laser 1540

The Laser 1540 from the Wipro stable is the cheapest laser printer around. The printer gave some acceptable results in our print quality tests. It deserves the Best Value award for its good print quality at decent

speeds, at an attractive price.

Wipro Laser 1540	A
Performance	▶▶▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶▶▶
Features	▶▶▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶▶▶

Specifications: USB and Parallel interfaces, 1,200 dpi, 250-sheet paper tray
Price: Rs 13,750 **Contact:** Wipro Peripherals **Phone:** 022-26397418
E-mail: helpdesk.mumbai@wipindia.com, **Web site:** www.wipindia.com

Canon S530D

The Canon S530D is one of the most feature-rich inkjet photo printers around.

The printer comes with a USB 2.0 interface for faster data transfer and a compact flash



card reader that allows you to insert the compact flash on any digital camera and take direct print-outs of photos. On the per-

formance front too, the printer certainly delivers. If you're looking for an inkjet printer that's the best in terms of performance and features, look no further.

Canon S530D	A
Performance	▶▶▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶▶▶
Features	▶▶▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶▶▶

Specifications: USB interface, 2,400 x 1,200 dpi (colour)
Price: Rs 24,995 **Contact:** Canon India Ltd **Phone:** 011-26806572
E-mail: brijesh@canon.co.in **Web site:** www.canon.co.in

HP 3325

The HP 3325 is a cute printer targeted specifically at home users. Despite its minimalist features, the printer gives



other high-end printers a run for their money. We consider the HP 3325 the best value printer available in the market.

HP 3325	B+
Performance	▶▶▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶▶▶
Features	▶▶▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶▶▶

Specifications: USB interface, 1,200 x 1,200 dpi
Price: Rs 2,999 **Contact:** HP India Ltd **Phone:** 011-26826000
E-mail: ashwini-k_agarwal@hp.com **Web site:** www.hpindia.com

HP Photosmart 130

This neat-looking printer is a specialised photo printer, loaded with features. One cannot make out whether the photo was developed in a store or taken from a photo printer. Its price is worth the perform-

ance it delivers.

HP Photosmart 130	B
Performance	▶▶▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶▶▶
Features	▶▶▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶▶▶

Specifications: USB interface, 4,800x1,200 dpi
Price: Rs 8,500 **Contact:** HP India Ltd **Phone:** 011-26826000
E-mail: barkha.deva@hp.com **Web site:** www.hpindia.com

SCANNERS

HP Scanjet 4570c

If quality is all-important to you, the HP 4570c will meet your requirements hands down. With a resolution of 2400 dpi and a 48-bit colour depth, this sleek scanner brings eyepleasing images to your monitor. It also has a connector for a transparency adapter, which makes it multifunctional and



extends its usability to other media types. The price of Rs 17,999 makes it out of reach of most

home users, but its build quality and performance are excellent, making it a perfect tool for those that can afford it.

HP Scanjet 4570c				
Features	▶	▶	▶	▶
Build quality	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶

Specifications: 1,200x1,200 optical resolution, USB interface, 48-bit colour depth
Price: Rs 17,999, **Contact:** Hewlett Packard India Ltd,
Phone: 011-6826000, **E-mail:** ashwini-k_aggarwal@hp.com,
Web site: www.hpindia.com

UMAX Astra 2500

The UMAX Astra 2500 is a workhorse. It's a very affordable and no-nonsense solution for simple day-to-day scanning, and is a worthwhile investment.

UMAX Astra 2500				
Features	▶	▶	▶	▶
Build quality	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶

Specifications: 600x1,200 dpi optical resolution, USB interface, 48-bit colour depth
Price: Rs 3,950, **Contact:** Neoteric, **Phone:** 022-24172600,
Email: sales@neoteric-info.com, **Web site:** www.neoteric-info.com

PRIMARY STORAGE

Samsung SP2001H

Though the Samsung SP2001H offers only 20GB space, it makes a great buy if you require a speedy drive and do not require too much hard disk space.

Samsung SP2001H				
Performance	▶	▶	▶	▶
Build quality	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶

Specifications: 20 GB storage capacity, 7,200 rpm
Price: Rs 3,550, **Contact:** Samsung Electronics India Information Telecommunication India Pvt. Ltd, **Phone:** 011-51511234,
E-mail: marketing@samsungindia.com,
Web site: www.samsungindia.com

Maxtor D540X-4K080H4

This mammoth drive has a capacity of 80 GB and its competitive price makes

it ideal for those who are looking for oodles of affordable storage space.



Samsung SP2001H				
Performance	▶	▶	▶	▶
Build quality	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶

Specifications: 80 GB storage space, 5,400 rpm
Price: Rs 6,150, **Contact:** Cyberstar, **Phone:** 011-26438216,
E-mail: sushilb@cyberstarin.net, **Web site:** www.maxtor.com

SECONDARY STORAGE

Iomega CDRW55296INT-B

Iomega's CD-Writer includes a 2MB buffer, and SMART-BURN technology to ensure there are no errors during the write process. It's rather expensive at Rs. 6,500, but delivers where it comes to performance.

Iomega CDRW55296INT-B				
Performance	▶	▶	▶	▶
Build quality	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶

Specifications: 48X (write), 24X (rewrite), 48X (read), 2 MB buffer memory
Price: Rs 6,500, **Contact:** Neoteric Informatique, **Phone:** 022- 24172600,
E-mail: salesbom@neoteric-info.com,
Web site: www.neoteric-info.com

LG 8320B

The LG 8320B is not only affordable but also feature rich, with a decent performance to boot. If you're looking

for an combination that is easy on price and high on performance, go for this drive.



LG8320B				
Performance	▶	▶	▶	▶
Build quality	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶

Specifications: 32X (write), 10X (rewrite), 40X (read), 8 MB buffer memory
Price: Rs 3,400, **Contact:** LG Electronics, **Phone:** 0120-2560900,
E-mail: response@lgebuy.com, **Web site:** www.lge.com

BenQ DVP-1648A

The BenQ DVP-1648A DVD-ROM drive gives the best results across the board. Its transfer rate is quite good. The best part is its competitive price, which will force rivals to rethink their pricing policy.

BenQ DVP-1648A				
Performance	▶	▶	▶	▶
Build quality	▶	▶	▶	▶
Value for money	▶	▶	▶	▶
Features	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶

Specifications: 16X (read for DVD), 48X (read), 512 KB buffer memory
Price: Rs 2,995, **Contact:** BenQ, **Phone:** 022-25705230,
E-mail: elwinarevello@benq.com, **Web site:** www.benq.com

LITEON LTD165H

LITEON's LTD165H DVD-ROM comes at a price that

will be a sure attraction for many. The price matches similar to that of CD Writers. It also serves as an excellent substitute for a CD-ROM drive, thanks to its fast data transfer rate. The drive has 512 KB



cache and comes bundled with Power DVD 4.0 DVD playback software. This drive offers a good blend of performance, features and price. It is also the cheapest drive available.

LITEON LTD165H						A
Performance						
Build quality						
Value for money						
Features						
OVERALL						

Specifications: 16X (read for DVD), 48X (read for CD-ROM) , 512 KB buffer memory

Price: Rs 2,550 **Contact:** Media Tech **Phone:** 022-56396696
E-mail: sales@mediatechindia.com **Web site:** www.liteon.com

FREECOM FHD-1 20 GB

FRECOM's FHD-1 20 GB drive manages to outrun every other contender in terms of pure performance. If you require a sleek drive that is USB 2.0 ready and does not cost a packet, go for this one!

FRECOM FHD-1 20GB						A
Performance						
Build quality						
Value for money						
Features						
OVERALL						

Specifications: USB 2.0 interface, 20 GB storage capacity.
Price: Rs 15,500 **Contact:** JS Equipment **Phone:** 022-23810713
E-mail: jse@vsnl.com **Web site:** www.freecom.com

Omega HDD 20GB Portable Hard Drive

The Iomega 20GB Portable Hard Drive weighs only 400 grams and is ideal for those who travel a lot. Costing about 60 paise per MB, the drive offers great satisfaction as far as value for money is concerned. The manufacturers provide a one-year replacement warranty and its attractive price

makes it a clear winner.

Iomega HDD 20GB Portable		A
Performance	★★★★★	
Build quality	★★★★★	
Value for money	★★★★★	
Features	★★★★★	
OVERALL	★★★★★	

Specifications: USB 2.0 interface, 4,200 rpm, 20 GB storage capacity
Price: Rs 12,200 **Contact:** Neoteric Informatique **Phone:** 022-24172600
E-mail: salesbom@neoteric-info.com **Web site:** www.iomega.com

Zoltrix Cool Disk - 128MB USB Pen Drive

With good performance, protection against unauthorised access and a very good price, this drive hits the sweet spot. A very good buy if you need a solid dependable portable medium.

Zoltrix Cool Disk - 128MB USB Pen Drive		B+
Performance	4.5	
Build quality	4.0	
Value for money	4.5	
Features	4.0	
OVERALL	4.25	

Specifications: Write-protect switch, status LED, bootable
Price: Rs 5,500 **Contact:** Kunhar Peripherals Pvt Ltd **Phone:** 022-56345758 **E-mail:** salesbom@kunhar.com **Web site:** www.zoltrix.com

Iomega CD-RW 48x24x48x (External USB 2.0)

Fed up with slow, bulky external burners? The black beauty from Iomega gives you enough reason to smile. This product is a good buy for those on the move. Blazing-fast writing and rewriting speeds make this drive a total *paisa-vasool*.

product.

Iomega CD-RW 48x24x48x (External USB 2.0)	B+
Performance	▶ ▶ ▶ ▶ ▶
Build quality	▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶

Specifications: External, USB 2.0 interface, 48X (write), 48X (read), 24X (rewrite)

Price: Rs 9,900 **Contact:** Neoteric **Phone:** 022-24172600
E-mail: sales@neoteric-info.com **Web site:** www.iomega.com

INPUT DEVICES

Microsoft Multimedia Keyboard

Microsoft's Multimedia Keyboard is a sheer delight to use. The keys are

smooth, and the feel is fantastic. It's definitely a must-buy.



Microsoft Multimedia Keyboard					
Features					
Build quality					
Ergonomics					
Value for money					
OVERALL					

Specifications: 16 hotkeys, PS/2 interface, wrist support

Price: Rs 1,606 **Contact:** Microsoft Corporation India Pvt Ltd **Phone:** 011-2629 2640 **E-mail:** connect@microsoft.com **Web site:**

Samsung PC Keyboard

Samsung has got it right with a sleek, great-looking black keyboard that provides good value for money. All said and done, Samsung sure has a winner on its hands with this economical keyboard.

Samsung PC Keyboard		B-
Features	▶▶▶▶▶	
Build quality	▶▶▶▶▶	
Ergonomics	▶▶▶▶▶	
Value for money	▶▶▶▶▶	
OVERALL	▶▶▶▶▶	

Specifications: No hotkeys, PS/2 interface, wrist support not bundled
Price: Rs 300 **Contact:** Samsung Asia Pvt Ltd **Phone:** 022-2281 4886 **E-mail:** marketing@samsungindia.com
Web site: www.samsungindia.com

Microsoft Wireless IntelliMouse Explorer

This wireless mouse from Microsoft is a delight to work with. It fits perfectly within a palm of any size and

shape, making long working hours easy on the hand. The twin colour—black and grey metallic—makes it look

attractive. The mouse is good for both gaming as well as regular office sessions. In all, this optical mouse is a worthy upgrade from the previous corded optical or the cordless Infra-red mouse.

Microsoft Wireless IntelliMouse Explorer					A-
Features	▶	▶	▶	▶	▶
Build quality	▶	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶	▶

Specifications: Optical mouse, USB interface, two extra buttons, two AAA batteries, Infra-red cordless.
Price: Rs 3,380 **Contact:** Microsoft Corporation India Pvt Ltd
Phone: 011-2629 2640 **E-mail:** connect@microsoft.com
Web site: www.microsoft.com

iball The King

The King is a functional combination of a trackball and a traditional three-button scroll mouse. The trackball is extremely convenient for



scrolling, and the device offers a good upgrade path for those looking to move on from traditional scroll mice.

iball The King					A-
Features	▶	▶	▶	▶	▶
Build quality	▶	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶	▶

Specifications: Optical mouse, PS/2 interface, no extra buttons
Price: Rs 950 **Contact:** The Best **Phone:** 022-26935135
E-mail: lata@bestitworld.com

Mercury Optical Scroll Mouse

The Optical Scroll Mouse from Mercury is a low-end optical solution for those who wish to evolve from the ball-mouse. If you're looking for an inexpensive optical mouse, look no further than this.

Mercury Optical Scroll Mouse					A-
Features	▶	▶	▶	▶	▶
Build quality	▶	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶	▶

Specifications: Optical mouse, USB interface, two extra buttons **Price:** Rs 550 **Contact:** Kobian India Ltd **Phone:** 080-5566626
E-mail: rohit@kobian.com **Web site:** www.kobian.com

Microsoft Wireless Desktop

This simple-looking wireless multimedia keyboard and mouse gives a complete cordless solution for the desktop, ideal for users interested in a clutter-free workspace.

Microsoft Wireless Desktop					A
Features	▶	▶	▶	▶	▶
Build quality	▶	▶	▶	▶	▶
Ergonomics	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶	▶

Specifications: 10 hotkeys, PS/2 interface, package includes a palm rest and a cordless optical mouse
Price: Rs 3,634 **Contact:** Microsoft Corporation India Pvt Ltd
Phone: 011-26292640 **E-mail:** connect@microsoft.com
Web site: www.microsoft.com

Typhoon iTek RF@Mouse and Keyboard

The Typhoon iTek RF@Mouse and keyboard combination works on the radio frequency band. The unit isn't ideal for long typing sessions. However, it's a good bundle at an affordable price.

Typhoon iTek RF@Mouse and Keyboard		B+
Features	▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶	
Ergonomics	▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶	

Specifications: 16 hotkeys, PS/2 interface, package includes a palm rest
Price: Rs 1,950 **Contact:** Hitech Computers **Phone:** 022-24927323
E-mail: bom@hitechit.com **Web site:** www.hitechit.com

Microsoft SideWinder Precision 2

The Microsoft SideWinder Precision 2 is ideal for the Indian gaming market. Its features and build quality make this product a reasonably priced choice for the casual gamer.

Microsoft SideWinder Precision 2		A-
Features	▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶	
Ergonomics	▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶	

Specifications: Three-axis control, eight programmable buttons, hat-switch, excellent throttle
Price: Rs 2,160 **Contact:** Trifen Technologies **Phone:** 011-26236061
E-mail: trifen@vsnl.com **Web site:** www.microsoft.com

GRAPHICS CARDS/ SOUND CARDS/SPEAKERS

Gainward Ultra/650 TV

This card is equipped with Ti4200 GPU which is nothing but the strip down version of Ti4600 in terms of core and memory clock. It's an excellent



choice for those who like to play games at high settings and watch movies.

Gainward Ultra/650 TV		A-
Performance	▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶	
Features	▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶	

Specifications: Ti4200 chipset, 270 MHz core clock, 570 MHz memory clock, dual monitor outputs, TV out (S-Video), 350 MHz RAM-DAC.
Price: Rs 10,500 **Contact:** Mediatech India **Phone:** 022-56396696
E-mail: sales@mediatechindia.com **Web site:** www.gainward.com

SMEDIA GeForce4 MX440

Is eye candy less important to you than skip free gaming? Then the SMEDIA

GeForce4 MX440 graphics accelerator is a real steal, and an efficient companion for

your newly bought system. This card can easily run most of the OpenGL based game without worrying about the frame rates. A decent buy for the price and features it comes along with.

SMEDIA GeForce4 MX440		A-
Performance	▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶	
Features	▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶	

Specifications: GeForce4 MX440 chipset, dual monitor out, S-Video TV out
Price: Rs 4,000 **Contact:** Xserve India **Phone:** 080-5572601
E-mail: vivek_gupta@xserves.com **Web site:** www.smedia.com

Gainward Ultra/750 8X XP-Ti4800 SE

This Golden Sample card is made from the best hand-picked components and is one of the best you can buy in the market—if you're looking at highest-quality gaming experience and loads of features, that is.

Gainward Ultra/750 8X		A-
Performance	▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶	
Features	▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶	

Specifications: Ti4800 SE chipset, 128 MB DDR memory at 550 MHz **Price:** Rs 16,275 **Contact:** Mediatech India
Phone: 022-56396696 **E-mail:** sales@mediatechindia.com
Web site: www.gainward.com

Creative SoundBlaster Audigy 2 Platinum

Music freaks will rave over it, multimedia professionals have been waiting for it, DJs and RJs will cover it. This is the kind of image that Creative's new Audigy2 Platinum has

brought along with it. It's not meant for everyone—only for the select few who demand nothing but the best. Believe us, if you can afford this card, it will turn your world around!



Creative SoundBlaster Audigy 2 Platinum		B+
Performance	▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶	
Features	▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶	

Specifications: DVD-Audio capability (24-bit with 192 KHz in stereo and 96 KHz in 5.1), 106 dB Signal to Noise Ratio, 6.1 surround sound capability, EAX Advanced HD support, WMA 9 support, FireWire port
Price: Rs 15,500 **Contact:** Creative Technology Ltd
Phone: 9820357713 **E-mail:** rajshekhar_bhattach@ctl.creative.com
Web site: asia.creative.com

Creative Vibra 128

Creative Vibra 128 is one of the best cards available for those who want decent

sound and have a budget of under Rs 1,000. The card has an built in amplifier for the

Line-Out port, which might be a boon to those with non-amplified speakers. It offers an ideal upgrade path for those stuck with onboard sound or an ISA-based card.

Specifications: 16-MIDI channel, 2.1 surround output, 16 bit CD-quality recording and playback, Mic-in, CD-Audio in, Line-out, Auxiliary in/rear out, MIDI/Joystick port

Price: Rs 1,100 **Contact:** Creative Technology Limited

Phone: 9820357713 **E-mail:** rajshekhar_bhattach@ctl.creative.com

Web site: asia.creative.com

Bose MediaMate Computer Speakers

Bose, a pioneer in the manufacturing of high-quality professional audio speakers, has come up with a solution for the perfect PC audio experience with its MediaMate



Specifications: Full-range stereo speakers, two RCA inputs, stereo headphone jack, 8.9 x 21.6 x 19.1 cm

Price: Rs 9,800 **Contact:** Bose Corporation India Pvt Ltd

Phone: 022-28324537/79 **E-mail:** bose_store@sify.com

Web site: www.bose.com

Artis S880

This all-back quad-channel speaker features a black wood finish and sports a very sophisticated workmanship. This speaker strikes a good balance between price and performance. S880 system stood out for its superior sound quality in gaming, as well as the movie tests where it provided powerful and

well-defined sound. If you already have a four-channel sound card, or intend to buy one, this is a good choice.

Artis S880 **B+**

Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: 10 Hz to 18 KHz frequency response, volume and bass control, 31 x 10 x 23.5 mm for subwoofer and 8.5 x 9.5 x 9.5mm for satellite

Price: Rs 4,000 **Contact:** Kunhar Peripherals Pvt Ltd

Phone: 022-56345758 **E-mail:** sales@kunhar.com

Web site: www.kunhar.com

Creative Vibra 128 **B+**

Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Creative Megaworks THX 5.1 550

Creative's latest offering, the Megaworks THX 5.1 550, will rock any music listener. These speakers are among the best you can buy for your personal computer. On the flip side, there are only analog inputs, no digital input. This is one hell of a sound system, simply superb! If you've got deep pockets, a large room and love

music, don't miss out on the best thing in the world of sound since—well, sound itself!

Creative Megaworks THX 5.1 550 **A+**

Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: 5.1 speakers, 150 W RMS subwoofer, 5 x 70 W RMS satellites, Frequency range 25 Hz to 20 KHz, 99 dB SNR

Accessories: Cable, desktop stands for satellite speakers, monitor stand for centre satellite speaker, wired remote control

Price: Rs 25,500 **Contact:** Creative Technology Ltd

Phone: 9820357713 **E-mail:** rajshekhar_bhattach@ctl.creative.com

Web site: www.creative.com

HANDHELD & LAPTOPS

ACi Emerald Pro

ACi's latest offering in India is the Emerald Pro, which boasts of a 2.4 GHz Pentium 4 processor. It may not sport the style or design of the big brands, but it's definitely a good choice for those who require superior performance for business

applications, at a very reasonable price.

ACi Emerald Pro **A-**

Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: Intel P4 2.4 GHz, 480 MB DDR SDRAM, 15.1-inch LCD Screen, 20 GB Hard Drive, 24X CD drive, built in Webcam, leather carry case, 2.8 kg weight

Price: Rs 94,000 **Contact:** Allied Computer International (Asia) Pvt. Ltd

Phone: 022-26733122 **E-mail:** sales@aci-asia.com

Web site: www.aci-asia.com

Toshiba Protégé 3500

The Toshiba Protégé 3500 is one of the first devices to feature the Tablet Edition of Windows XP Professional.



Targeted essentially at the business user on the move, the Protégé 3500 churns out a decent performance. Its price may not be a limiting factor for a mobile executive but for others it is still too high.

Toshiba Protégé 3500 **B+**

Performance	▶▶▶▶▶▶
Build quality	▶▶▶▶▶▶
Value for money	▶▶▶▶▶▶
Features	▶▶▶▶▶▶
OVERALL	▶▶▶▶▶▶

Specifications: Pentium III 1.3 GHz mobile processor, 256 SDRAM, 40 GB hard drive, 12.1-inch TFT, 10 Base-T/100 Ethernet, integrated modem, infrared, integrated 802.11b wireless LAN, two USB 2.0 ports, one RGB port, one Type II/Type I PC card slot, one SD card slot and one Compact Flash Type II slot
Price: Rs 1, 99, 999, plus taxes **Contact:** HCL Infosystems Ltd
Phone: 0120-4544534 **E-mail:** notebook@hclinsys.com
Web site: www.tabletpc.toshiba.com

Tungsten T

The Tungsten T comes in corporate grey, to go with the pinstripe suits; is tiny enough for a snug fit within the palm of your hand and inside your shirt pocket; and stays at the forefront of innovation, thanks to the new Palm OS 5.0, support for

faster ARM-based processors and a 320 x 320 resolution.

Tungsten T		B+
Performance	▶▶▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶▶▶	
Features	▶▶▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶▶▶	

Specifications: 159 gm, 16 MB RAM, Palm OS 5.0, 320 x 320, 65,536 colours reflective TFT display, rechargeable lithium-ion polymer battery, Bluetooth 1.1 compliant, dual expansion via SD/Multi-MediaCard expansion slot, Palm Universal Connector for peripheral attachment, Infrared port
Price: Rs 28,500 **Contact:** Tech Pacific Technology (India) Limited
Phone: 022-55960101 **Web site:** www.palm.com

MOBILE PHONES

Sony Ericsson P800

The P800 is the first attempt from Sony Ericsson to break into the phone-and-PDA combination market. We recommend this only for the business-class user



who is always on the move and would actually make use of the variety of options offered by this phone.

Sony Ericsson P800		A-
Performance	▶▶▶▶▶▶▶▶	
Build quality	▶▶▶▶▶▶▶▶	
Value for money	▶▶▶▶▶▶▶▶	
Features	▶▶▶▶▶▶▶▶	
OVERALL	▶▶▶▶▶▶▶▶	

Specifications: Symbian 7.0 OS, Expandable memory, Excellent PDA functionality, Triband, GPRS, WAP
Price: Rs 39,995 **Contact:** Sony Ericsson Mobile Communications International **Phone:** 011-26180808 **E-mail:** sudhin.mathur@sonyericsson.com **Web site:** www.sonyericsson.com

Sony Ericsson T200

Look at the T200 will impress most users. This phone is a very feature-rich companion with a weight of just 85 grams and decent

enough grip so it does not slip out of your hand. The T200 scores on the feature front too, by having a WAP 1.2.1 browser and GPRS capa-

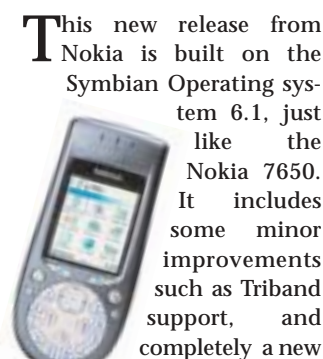


bility for a 43.2 Kbps data transfer rate over the Internet. It is definitely worth the cash you'll shell out for it.

Sony Ericsson T200 A	
Performance	▶ ▶ ▶ ▶ ▶ ▶
Build quality	▶ ▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶ ▶

Specifications: Triband, GPRS, WAP
Price: Rs 6,495 **Contact:** Sony Ericsson Mobile Communications International **Phone:** 011-26180808 **E-mail:** sudhin.mathur@sonyericsson.com **Web site:** www.sonyericsson.com

Nokia 3650



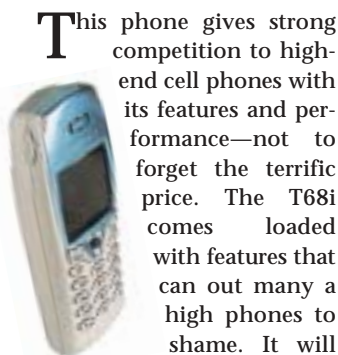
This new release from Nokia is built on the Symbian Operating system 6.1, just like the Nokia 7650. It includes some minor improvements such as Triband support, and completely a new

design. The buying point would be the cheaper price tag, external memory support and a 16 MB bundled stick.

Nokia 3650 A-	
Performance	▶ ▶ ▶ ▶ ▶ ▶
Build quality	▶ ▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶ ▶

Specifications: 176 x 208-pixel display, Video capture and playback, image capture at 640 x 480, 4MB internal dynamic memory, Bluetooth, GPRS
Price: Rs 23,399 **Contact:** Nokia India Pvt Ltd **Phone:** 011-26779001 **E-mail:** k.sriram@nokia.com **Web site:** www.nokia.com

Sony-Ericsson T68i



This phone gives strong competition to high-end cell phones with its features and performance—not to forget the terrific price. The T68i comes loaded with features that can out many a high phones to shame. It will

appeal to people from all walks of life, making it a far better buy than other phones in its category.

Sony-Ericsson T68i B	
Performance	▶ ▶ ▶ ▶ ▶ ▶
Build quality	▶ ▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶ ▶

Specifications: GPRS, HSCSD, WAP, Bluetooth
Price: Rs 14,995 **Contact:** Sony Ericsson Mobile Communications International **Phone:** 011-26180808 **E-mail:** sudhin.mathur@sonyericsson.com **Web site:** www.sonyericsson.com

DIGITAL CAMERA

Canon Digital IXUS 330

Canon's Digital IXUS 330 is probably the best-looking digital camera. It is a com-

pact beauty in a steel-aluminium case with an excellent metallic finish. The cam-

era can be used to record short movies of a maximum of 30 seconds at the lowest resolution. The constraint is the camera's limited memory—just 8 MB. The movies can be viewed on a television screen using an AV connector. The camera brings along 8 MB Compact Flash (Type 1)

card. Sadly, it has no internal memory. It has excellent features and great compatibility with the PC. However, would you pay twice the amount simply for a better design, user-friendly interface and a few other features?



Canon Digital IXUS 330 B+	
Performance	▶ ▶ ▶ ▶ ▶ ▶
Build quality	▶ ▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶ ▶

Specifications: 2 megapixel maximum 1,600 x 1,200 resolution, 3X zoom lens, 1.5-inch LCD screen, 8 MB compact flash, Canon Li-Ion NB-L1H 840 mAh Lithium-ion battery, JPEG storage format
Price: Rs 39,995 **Contact:** Canon India Pvt Ltd
Phone: 011-2680 6572 **Fax:** 011-26807180
E-mail: brijesh.verma@canon.co.in **Web site:** www.canon.co.in

Olympus C-5050ZOOM

The Olympus C-5050 ZOOM is an upgrade from the C-4040 and offers better resolution, a sleeker look and

some added features. The large number of fine adjustments makes this an ideal camera for the semi-professional photographer.



Olympus C-5050ZOOM A-	
Performance	▶ ▶ ▶ ▶ ▶ ▶
Build quality	▶ ▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶ ▶

Specifications: 5 megapixels, maximum resolution 2,560 x 1,920, optical viewfinder, Auto Focus, CCD sensor, 1.8-inch TFT colour LCD display, 3X optical zoom, support for RAW, JPEG, TIFF picture formats
Price: Rs 49,995 **Contact:** Komal International **Phone:** 022-22631366
E-mail: indiaolympus@vsnl.com **Web site:** www.olympus.com

MP3 PLAYER

Creative DAP-CD0001

This MP3 Player not only looks good, but also comes with an impressive 120-second buffer to eliminate skipping. This



player delivered consistent performance in the audio test, which means everything from bass, treble, vocals and so on are rendered with-

out any distortion. It also comes with a power save mode and a line-out to get attached to external systems. This is one gizmo you must pick up the next time you go shopping.

Specifications: Reads 700 MB CD-R and CD-RW, earphones, two AA batteries, weight 205 gm
Price: Rs 8,625 **Contact:** Compuage Infocom **Phone:** 022-23842200
E-mail: info@compuageindia.com **Web site:** www.creative.com

NAPA DAV316

If you want a feature-rich MP3 player but don't have the required moolah, the NAPA DAV316 CD-MP3 player is the answer to your prayers. The player comes with rechargeable batteries but no warranty. Performance was good with perfect brass and treble. Although bulky it's one

Specifications: Reads 700 MB CD-R and CD-RW, neck strap, earphones, AA NiMH battery, 300 gm weight
Price: Rs 5,650 **Contact:** Moon Computers **Phone:** 022-22653390
E-mail: sales@moonindia.com **Web site:** www.moonindia.com

Creative DAP-CD0001					A-
Performance	▶	▶	▶	▶	▶
Build quality	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
Features	▶	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶	▶

of the cheapest CD-MP3 players available in the market.

NAPA DAV316					A-
Performance	▶	▶	▶	▶	▶
Build quality	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
Features	▶	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶	▶

Creative NOMAD MuVo

You'll really enjoy listening to songs on this one. It can dish out some pretty high decibels. The MuVo's USP is that it doubles as a removable USB drive—a uncommon feature. The player uses the same USB

interface to connect to the computer and battery pack. What's more, it can detect all the MP3 files on the drive. Although a 64 MB storage is a bit disappointing with 128 MB available and 256 MB on the way. Crank up the volume to the fullest and you get ear-splitting sound, with hardly any distortion. Excellent stuff, this.



Creative NOMAD MuVo					B-
Performance	▶	▶	▶	▶	▶
Build quality	▶	▶	▶	▶	▶
Value for money	▶	▶	▶	▶	▶
Features	▶	▶	▶	▶	▶
OVERALL	▶	▶	▶	▶	▶

Specifications: 64 MB internal memory, neck strap, earphones, manual, driver CD
Price: Rs 11,299 **Contact:** Creative Technology Ltd
Phone: 9820357713 **E-mail:** rajshekhar_bhatt@ctl.creative.com
Web site: www.creative.com

AD

Office-in-waiting MS Office 2003

Microsoft is making available the 2nd Beta version of the next Office to all comers. Take a look at what's on offer.

In practice, Microsoft releases a new version of its Office suite every two years. This time, it has condensed the gap, giving users less time to decide whether to upgrade or not. This is due to fine competition from opponents such as Sun, which performs well with its StarOffice and small time developers. Dubbed as Office 11, this upgraded version has got a few added features to its name such as OneNote for E-note making (for Tablet PC users) and Info Path to create XML documents.

It has also come up with its Business Contact Manager—an Outlook add-on—to help sort contact databases. An added feature called the Rights Management Service helps users protect files and e-mails.

The new SharePoint Team Services 2.0 (which works only with the new Windows Server 2003, Internet Information Services 6.0 and SQL Server) features a document workspace where employees share documents with co-workers. SharePoint also offers a new Meetings workspace for conducting online presentations, sharing meeting minutes and action items, and managing all materials and follow-up actions.

All in all, Microsoft has focussed more on ease of use in most applications and some of them have been awarded with a lot of new features. To an individual user, there may not be major compelling reasons to upgrade from first looks, but for an enterprise environment with long document lifetimes, XML integration and beefed up collaborating features are very serious reasons to take a look.



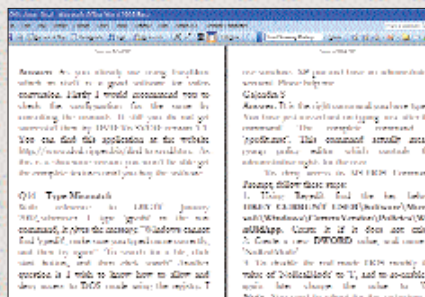
Style and formatting restrictions: With Word 2003, you can use the Style Lockdown feature that disables direct formatting. This allows complex documents to be edited by many people while retaining structured formatting.



Formatting restrictions

Range Permissions: Range Permissions allow portions of a document to be protected against editing by some or all users. Hence you can first protect the whole document against any edits, then assign permissions to individual portions of the document by selecting them and choosing which users should be able to edit that selected area.

New reading mode: The new Reading Layout makes it easier to read documents

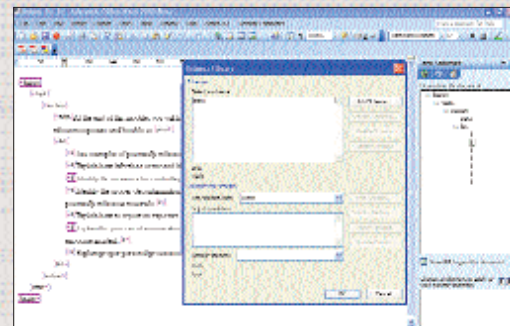


The new reading mode makes on screen reading easier

on screen. The text is displayed with clean margins, shorter lines, a larger font and space permitting two pages per screen. This makes on-screen documents easier to read.

Write inside of Word comments: Word provides an ink comment bubble feature, which allows you to ink inside of Word comments with all of the same features, such as the ability to filter by the author. Using Comment bubbles ensures that the annotations will remain anchored to the text that was commented on as the document is edited later on. **Two ink modes:** In addition to annotating directly on the document surface, users can insert hand-drawings in Word through the same interface as pictures or text boxes. You are given a canvas inside the document for their sketches, which acts like an ink picture. Double-clicking on the ink image produces a format ink dialog box, in the same way as a text box or picture, with options to wrap text around the ink, resize the canvas, etc. **Thumbnail view:** Apart from the usual views provided, an all-new thumbnail view; very similar to the thumbnail view in Adobe Acrobat Reader, has been provided for easy navigation in large documents. **Thesaurus:** Word 2003 now includes a thesaurus via the Research task pane, for those times when you are looking for just the right word.

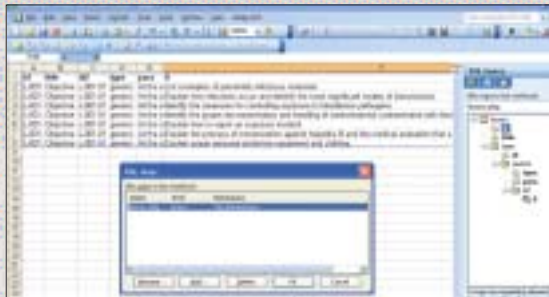
XML in Word 2003: Word 2003 allows documents to be saved in XML and supports the creation of templates based on customer-defined schemas. You can choose to save just the data or round-trip with full formatting preservation.



User-defined XML schemas structure documents

Microsoft Office Excel 2003

Excel 2003 is now able to consume and generate XML data files expressed in customer-defined XML schemas, not just the XML Spreadsheet Schema. Apart from a spreadsheet application, Excel is also an



Generate XML data files expressed in XML schemas

efficient XML editor for analysing and displaying up-to-the-second business information. Some of the new features in Excel are as follows:

Mapping tool: Excel 2003 provides a mapping tool that works much like a field chooser. With it, you can easily map existing Excel spreadsheets to XML data structures such as databases for import without writing any code.

Excel lists: You can now add structure around the data that you track in spreadsheets. The List feature provides a data entry row at the bottom of the list that automatically expands the list region as new items are entered. In addition, once data is in an Excel list, operations such as printing, charting, or creating a pivot table are made easier to perform.

Microsoft Office Access 2003

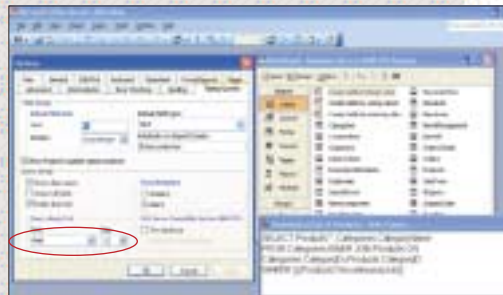
Integration with spreadsheet Web component: The new Spreadsheet Web Component feature in SharePoint Services can accept any Excel spreadsheet that is mapped to an XML schema, and provide that data to both SharePoint and non-SharePoint data sources.

Back up database: Office 2003 gives users a way to back up critical database files directly from within Access. You can now conveniently back up your important database files to a consistent location on a local system or shared network.

Access also performs a Compact and Repair action to ensure that the file is internally consistent.

Dependent objects: The new Dependent Objects feature will make it easy to determine the dependents of any object in a Jet database, reducing the debugging time needed to make a modification to an existing Access application. This feature is only available for Jet database files. There is a new 'Dependents...' command added to the shortcut menu when right-clicked on a database object. This will only be visible while right-clicking on a Table, Query, Form or Report. The 'Dependents...' command is also available in the View menu.

Font control for the SQL window: while this is not a mission-critical feature, it sure does make working with the SQL window less painful. This accessibility feature allows developers and users that create and edit Microsoft SQL Server queries



Now control the font in the SQL window

to control the font size of the text in the SQL window.

Font control can be accessed from the Tools menu, under Options, by selecting the Tables/Queries tab. There is a set of controls that allow you to set the font and size.

Make Local Table: Copying a linked table into the local database is a common technique for optimising performance for slow running reports that use linked tables or queries. In previous versions of Access, you needed to create a complex Make Table query to perform this task. Now, you can simply copy the linked table to the clipboard and paste it back into the database, or find this action in the task pane as a common task for Linked Tables.

Getting Started

Microsoft Office Online

- Welcome to the Office 11 Beta
- Enter a bug
- Read newsgroups

More...

Search:

Example: "monthly calendar template"

Open

- DesignGallery.xls
- Office.xls
- DesignGallery.xls
- Freeware.xls

More...

Create a new workbook...



Propagate field properties: This feature allows you to modify a field property in one place and propagate that new value to all controls that are bound to that same field. Anyone that develops Access applications will appreciate how easy it is now to propagate properties set on a table to all of its related forms and reports. In the past, developers had to go through each related object and set the property manually—at the risk of forgetting some. This feature greatly reduces that risk as well as the time consumed by this task.

Whenever you modify a property that is inherited on a field, when in the Table Design view, Access will display the 'Property Update Options' Smart tag that offers an option to "Update <property name> everywhere <field name> is used."



Shared data: Sharing is simplified by presenting shared data right along with a user's own data. For instance, you can view other calendars to which you have access, right next to your own calendar.

Expand distribution lists: Distribution Lists can now be expanded to display the names of the people on the list. This makes it easy to add or remove a few names before sending, without having to modify the distribution list or start from a scratch when addressing an e-mail message.

Block external content: By default, Outlook 2003 helps protect the privacy of its users, and provides them with more

control over the information in their inbox, through a feature called Block External Content. If an e-mail message tries to connect unannounced to a Web server on the Internet, Outlook 2003

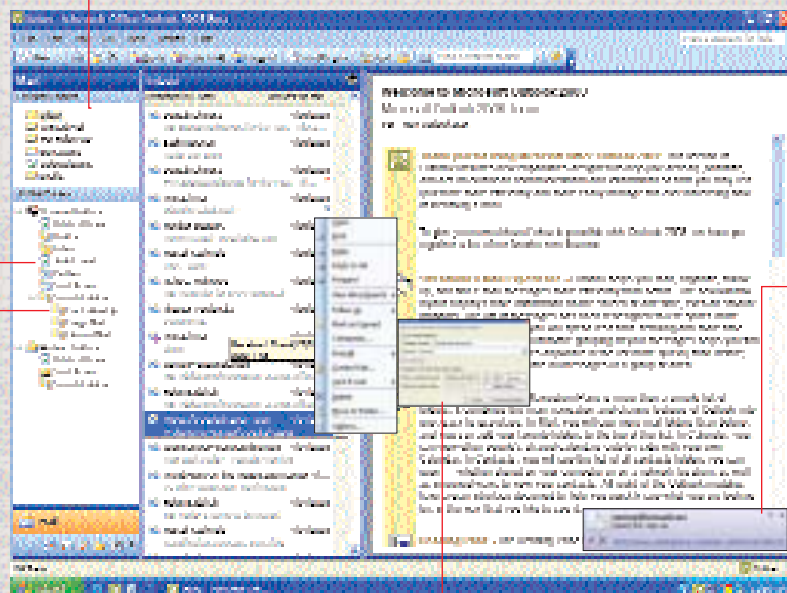


External content settings in Outlook 2003

Junk e-mail filter: Outlook's new junk e-mail filters evaluate whether a message should be treated as junk based on several factors, such as the time it was sent and its contents. You can still create a Trusted and Junk Sender list that will supersede the decisions made by automatic filtering.

Search Folders: With the introduction of these new folders, Keeping track of mail that satisfies a complex search criteria is easy. You could set up a folder that keeps track of all mails to a certain account that contain interesting words, for example. Some sample folders are created by default.

Navigation Pane: The Navigation Pane is designed to build more efficiency into Outlook by combining the main navigation and sharing aspects of the application into one easy-to-use pane. With the Navigation Pane, users get more relevant and context-sensitive navigation through Outlook and not simply a static list of folders.



New mail desktop alert: An all-new alert feature is incorporated in Outlook 2003, which pops up on receiving a new e-mail. It contains buttons to open, flag or delete the e-mail message, and fades out just as subtly as it faded in if it's ignored.

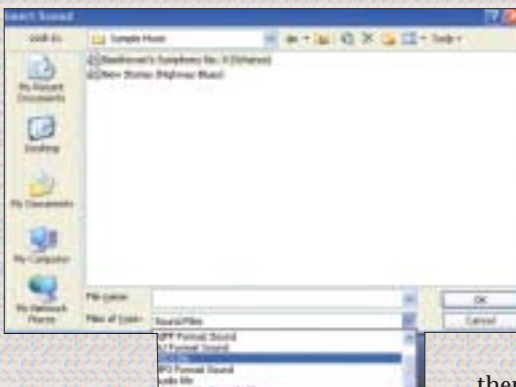
Outlook rules and alerts Improvements: The experience for creating new rules has been streamlined and made easier for common rules, making it easier for people to stay organized using simple inbox rules, and to view and change rules once they're created. Common rule actions can be viewed graphically and modified quickly. In addition, users can associate alerts with their rules to stay abreast of current information.

Hide when minimized: At last Microsoft includes a feature, that was much needed by regular users. Outlook does not appear in the taskbar when its main window has been minimized. Instead, Outlook disappears into the notification area, still collecting messages and waiting for the user to double-click the icon and bring Outlook back.

Outlook 2003 with Business Contact Manager makes small business owners and sales people more productive by enabling them to track their business relationships and sales opportunities in one place. Outlook 2003 with Business Contact Manager also helps small businesses connect to their customers through integration with List Builder, an e-mail marketing service from Microsoft bCentral, and to their business data through integration with other Microsoft Office 2003 applications.

Contact picture: Pictures can be added directly into a contact, giving you the ability to associate a face with the name and other information in the contact.

Expanded play list formats: PowerPoint now supports the following play list formats: ASX, WMX, M3U, WVX, WAX and WMA. Also, if a media codec (necessary to play the files) isn't present on the system, PowerPoint will try to download it using Windows Media Player technology.

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PowerPoint has also updated the pen tools in Slide Show with more colours and types of pens to choose from, as well as giving you the ability to highlight parts of the presentation using a new highlighter tool.



PowerPoint viewer and package for CD: In PowerPoint 2003, in conjunction with the Package for CD feature, authors can package presentations onto a CD and optionally include the new



Packaging presentations for CDs

Web Packages: You can package a portion of your Web site based on Microsoft Windows SharePoint Services Beta 2 into a functional module that other users can add to their site. For example, you can package a service solution that is specific to a certain type of business. You can then convert that functionality into a convenient single file format, and import it to other Web sites.

When you view folder contents in Publish view, the files are marked with icons and descriptive text indicating the publish status, such as Don't Publish, Changed, Unchanged, New, and Conflict. You can filter the view to show the folder contents, files to publish, files not to publish, and files in conflict.

Interactive buttons: You can add professional looking buttons to your Web page by selecting from a list of JavaScript-based buttons. Once you have selected a button, you can change the settings, such as add the button text, choose the font, button colour, define a link and define the image and text settings for original, hover and pressed states.

Optimise HTML: You can generate clean HTML code in your pages when you publish files from a Web site to a remote Web site. This means that you can reduce the size of a page by removing unnecessary formatting and tags, thereby optimising the code. Web

designers often use white space to make HTML more attractive to view, but it is unnecessary for the page to function properly. You can remove empty tags, redundant font and nested tags, unused and empty style definitions and even certain tags that you specify.

XML integration: You can use Extensible Markup Language (XML) to complement, rather than replace, your use of HTML. You can view or edit files, apply standard formatting to the structure of code in XML files, view the XML tree and create custom displays of XML data on Web pages. For example, you can use FrontPage to create a Web page that displays data from an XML file, format that data, and apply filtering, sorting, and conditional formatting to display the data the way you want.

Macromedia Flash support: To enhance and update your FrontPage Web site, you can add Macromedia Flash content such as short movie strips, repetitive audio-enhanced animations, previously recorded educational presentations or courses and more. You can set options for automatic playback such as playing a short animation once when the site visitor first loads the page or looping the content to play continuously.

Behaviors: Behaviors are scripting options that enable you to quickly add interactivity or increased functionality to text or other elements of your Web page. For example, you can specify that a sound file must play as a result of a site visitor clicking a graphic on a Web page. You can also view and edit the scripts associated with the current page by viewing a list in the Behaviors task pane.

Dynamic Web templates: You can save an HTML file as a dynamic Web template (*.dwt) that you can use to create and attach other HTML pages that share the same layout. You can protect your layout by specifying regions within the template as editable and non-editable. This means that you can allow other users to add and edit content but not change the layout of the master page template. Each time you update a dynamic Web template, all pages that are based on that template update as well.

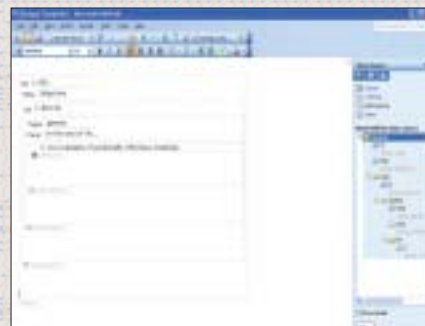
Layout tables: You can select from a list of pre-defined layouts and then apply

them to your Web pages. The layout tables are located in an easily accessible task pane. Therefore, when you are planning and designing your Web pages, you can quickly and easily try a variety of layouts before you make your final decision. **Image tracing:** Image Tracing is when you create a mock-up image of a Web page in a graphics program and then use it as a visual guide to create or trace the Web page design in FrontPage. You can show or hide the image, set its opacity, and change its position. You can view the tracing image in both the Design and Split views in FrontPage. Site visitors do not see the tracing image when viewing the site using a Web browser.

Layers: A layer is a container in a Web page that holds HTML page elements such as text and graphics. You can overlap, nest and show or hide layers on a page. You can also animate layers by using the Behaviors task pane, which enables you to add Dynamic HTML (DHTML) script to any tag within a Web page. In the Layers task pane, you can view an itemised list of all the layers within your Web page.

Other new additions

InfoPath: This application, named X docs in its beta stage, allows you to create templates and schemas; and the editor allows information to be entered and viewed. The idea is to provide you with a set of 25 templates based on industry-standard XML. That will enable develop-



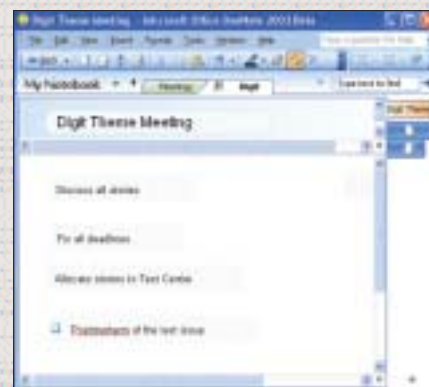
Creating templates and schemas using Info Path

ers, third parties, corporate IT programmers and technical users to create additional templates, based on the XML schema they define, specific to their business or industry. Information will then be

entered onto these templates.

That allows customers to decide, through their own schema, what that data should look like. And because it's XML, we can then parse that data out of the document and send it to any XML-enabled back-end system from where it can also then be retrieved. It thus complements customers' existing infrastructures.

A better way to take notes: One Note allows for handwritten or typed notes, or both. Audio files, such as recorded conference calls, can also be inserted into



Improved note making

One Note, as can images captured from sources such as the Web or hand-made sketches with a stylus. One Note is aimed at a larger audience ranging from students doing research to business people managing notes taken down at meetings. One Note integrates, in some fashion, with Office applications. From One Note, for instance, you'll be able to e-mail your digital notes via Outlook.

Will it, won't it?

It is indeed good to see that Office applications will have support for XML. However, as seen above, Microsoft has improved FrontPage and Outlook a great deal but the rest of the applications in the Office suite have been given minimal improvements. Unlike the Office 2002 release, which had major improvements from 2000, we don't see significant improvements with this release. Since it is yet in its beta stage, we will have to wait and see what the final release has in store for the users. ■

MITUL MEHTA

Here be the fire

Agent 001 stares piracy in the face

Fact: Software companies lose crores of revenue annually to piracy, 70 per cent of the software in India is pirated—we are the eight largest consumers of pirated software. Most of us don't even care. Last week I found out why.

It was a normal day in the life of Agent 001—just saved the world from invading aliens, installed a wireless home network for my grandparents and cajoled a friend to opt for an AMD solution—the evening would be quality time with my PC. Or so I thought. The phone rang. The assembly stork had just delivered a spanking new computer to my neighbourette. The lady was in distress and if there is one thing that appeals to this double-O, (apart from the Palm Zire 71) it is rescuing budding princesses from the evil clutches of technology. Where's the fire?

"Now that I have this spanking beige blinding my senses, how can I use it to best extract all the Rs 20,000 that I sunk into it?" asks the lady, pointing out the fire. "Software, madam is the antidote to all your problems, stuff it with office suites, anti-virus solutions, firewalls, image editors and games; and pretty soon, you will have fun and productivity ringing through these pink walls." My suave best, a pseudo-American accent duly attached, to further enhance the air of superiority and foreknowledge of all things digital. She asked prices. Of all the things she could have asked about, she had to ask about prices! "Windows XP

Professional Rs 9,900, Office XP Professional Rs 18,500, Macro...", you had to hear the screams! Hell indeed hath no fury like thus displayed. "How can software, something that comes on a plastic-ka CD cost so much? This is daylight robbery! Insanity!" Hands flayed with murderous intent, lips uttered words that dare not appear in print. The world reeled.

Run Agent run

If software be the new religion, piracy is the taboo that everyone loves to indulge in. Everyone. Given the asking price of most software, there is little left to debate, but morality. The latest Windows OS costs upwards of Rs 7,000; Microsoft's Office suite upwards of Rs 15,500 and may the angels send you a cheque if you work with a 3D publishing tool—Rs 1,45,000 for 3D Studio MAX!

A brisk walk to the nearest market, and illegal copies of games and productivity applications abound with naked excess. Burned using the fastest CD-Writers (Rs 3,000 and falling) on the cheapest CD media (Rs 10 and falling), adorned with the flimsiest covers (photo-copied at 10 paise, thank you very much) and displayed on make-shift shacks that can disappear faster than a magicians' rabbit; voila—Rs 80 for the *laatesh maal!*

Authority? "We have to grease the palms of cops on a regular basis", says a local seller. Those anti-piracy dudes? "Even those people get their cut". Surprise raids? "Doesn't make a difference, we know in advance when they will raid, and we hide most of the CDs before they come." He further added that all these CDs are locally



ILLUSTRATION: Mahesh Benkar

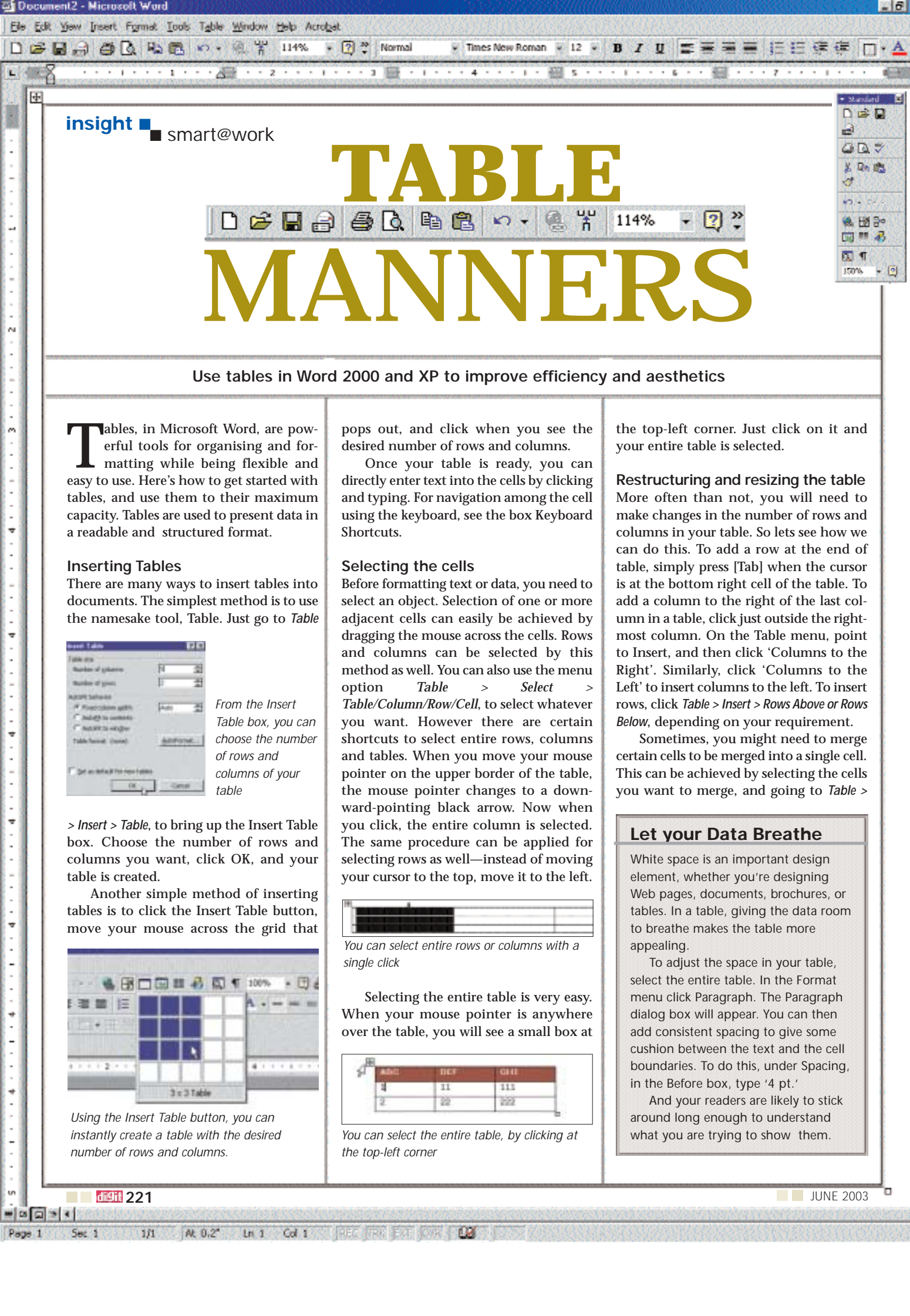
made and the suppliers come around on a monthly basis asking around for new orders. They take back the unsold CDs and replace them with newer versions.

The market is just one source of such warez: your friend, your colleague, your neighbour... with the Internet pinging every home, all you need is bandwidth and peer-to-peer software to get your hands dirty. The thing is, most of us are unaware of the wrongs attached to piracy. It is tantamount to stealing, you are supposed to pay for it, so cough up and put up. Those who can afford to cough, do it. Those who can't, shrug and pirate.

If morality be the bone of contention in your kebab, then open-source software offers a handy toothpick. You can get a Linux distribution, for example, for a little over Rs 3,000. A distribution packed with all and sundry: office suites, games, image editors, MP3 players, you name it, it got it. Linux is young for the desktop—teething and crying, it grows everyday—but is unlikely to be able to run your favourite game or the application you are most familiar with.

What India needs is affordable software. Is anyone listening?

A Hole in your Pocket		
	Licensed Copies	Pirated Price
Windows XP Professional OEM	Rs 6,900	Rs 80
Windows XP Professional Full	Rs 9,900	Rs 80
Office XP Standard	Rs 15,500	Rs 80
Office XP Professional	Rs 18,500	Rs 80
Macromedia Flash	Rs 19,900	Rs 80
Director 8.5	Rs 43,500	Rs 80
Tally 6.3 Single-User	Rs 18,500	Rs 80
Tally 6.3 Multi-User	Rs 37,000	Rs 80
Adobe Photoshop 7	Rs 33,000	Rs 80
3D Studio MAX 5	Rs 1,45,000	Rs 80
*All prices are indicative and are subject to change and may differ from region to region		

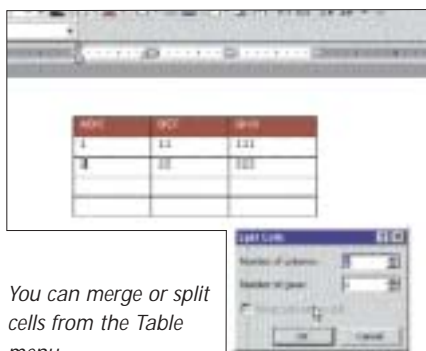




Inserting rows or columns, can be done using the Insert menu

Merge Cells. To split a cell, click the cell you want to split, and click *Table > Split Cells*, specify the number of rows and columns, and click OK to split the cell. For deleting cells, select the cells and go to *Table > Delete > Cells*. To delete the entire column or row, go to *Table > Delete > Rows or Columns*.

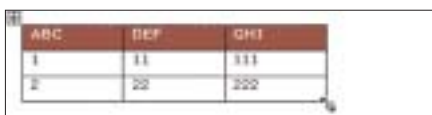
When Word creates the table, by default, it acquires the whole page width.



You can merge or split cells from the Table menu

When you want to resize the table, hold the pointer over the table until the table resize handle (a little box) appears on the lower-right corner of the table. Now, hover the pointer on the table resize handle, until a double-headed arrow appears. Drag the table boundary, until the table is the size you want.

To resize the column, rest the pointer on the column boundary until it becomes a resize tool (parallel lines with a double headed arrow through it), and then drag the boundary until the column is the



Resizing a table to fit into your window, is done by dragging the border when the resize handle appears



Resize rows and columns by dragging the boundaries

width you want. Use the same technique to resize rows.

Formatting table

You can enhance your table by adding borders and filling cells with colours, patterns, or shading. You can also use the Table AutoFormat command to quickly give your table a different look, using a predefined template.

To add a border to the entire table, click anywhere in the table. Then in the Format menu, click Borders And Shading and click on the Borders tab. When you insert a table, it has a black, half-point, solid single-line border by default. Use the Style, Color and Width options to add a different border. Make sure the correct option—Table or Cell—is selected under Apply To.

To specify that only particular sides get borders, click Custom under Setting. Under Preview, click the diagram's sides,



Format the borders and shading from Format menu

or use the buttons to apply and remove borders. Click OK and you're done.

To add shading in a table or cell, go to *Format > Borders and Shading*, and then click the Shading tab. Select the options you want. Be sure to click the part of the document you want to apply shading to, under Apply To, and finally, click OK.

AutoFormat is a quick way to format your tables. It changes borders, shading and resizes the cells to fit the content. Using this is fairly easy. Click anywhere in the table, and in the Table menu click Table Autoformat. You will be presented with a dialog box with various formats, which you can choose from, to format your table.



Using the Table Autoformat option, you can customise your table

TIP Tips for Power Users

■ Automatically labelling figures and tables with captions

To make Word automatically label your figures and tables with captions, go to *Insert > Caption > AutoCaption*, under 'Add caption when inserting', choose the items you want, click OK and then OK again to save your settings.

■ Fixing a 'bumpy' Word table

Sometimes the cells of a Word table can become misaligned so that the columns have jagged edges. To fix this problem, click inside the table and open the Table menu. Click on Select Table, then open the Table menu again, and click Convert Table To Text. Finally, open the Table menu once more and click Convert Text To Table.

■ Drawing a diagonal line in a cell

After you insert your table, right-click any tool bar and click 'Tables and Borders' from the pop up menu. Use the pencil tool and individualise any cell.

■ Wrapping text around a table

Click on the table, go to *Table > Table Properties > Table*. Under Text Wrapping, click Around.

Keyboard Shortcuts

Use these key combinations in Word to hasten your work with tables:

To select the entire table	[Alt] + Num [5] (NumLock should be off)
To update the table formatting to match the applied formatting set	[Alt] + [Ctrl] + [U]
To add a new line to current cell	[Enter]
To move to the next column (on the right)	[Tab]
To the previous column (on the left)	[Shift] + [Tab]
To the cell in the next row (one row down)	The [Down] Arrow key
To the cell in the previous row (one row up)	The [Up] Arrow key
To the beginning of a cell entry	[Home] or [Ctrl] + [Left Arrow]
To the end of a cell entry	[End] or [Ctrl] + [Right Arrow]
To split a table	[Ctrl] + [Shift] + [Enter]
To select entire column	[Alt] + click
To insert a TAB mark in cell	[Ctrl] + [Tab]

'Other' under 'Separate' text at, and put a comma—as our text is separated with commas. Click OK, and the text is converted into a table.

Achieving decimal align in a column of cells

Highlight the cells to be decimal-aligned. Make sure they are aligned left to start. At the left of the ruler line, click the little L (left tab) until it becomes a decimal centring tab—inverted T with a dot on it. Then click on the ruler line above the highlighted column of numbers. The decimals should jump into alignment. You can adjust them left or right, by clicking on the new decimal tab on the ruler line. You will see a vertical dotted line, which you can drag left or right to decimal-cen-



Change the way text flows by selecting Text Direction from the Format menu

Change the orientation of text

By default, Microsoft Word aligns text horizontally in table cells. You can change the text orientation. Select the cell that contains the text. Go to **Format > Text Direction**, and click the orientation you want. Click OK and the orientation changes.

Word aligns the text in cells, to the upper left corner. You can change this



Choosing the type of cell alignment you want for your table is just a right-click away

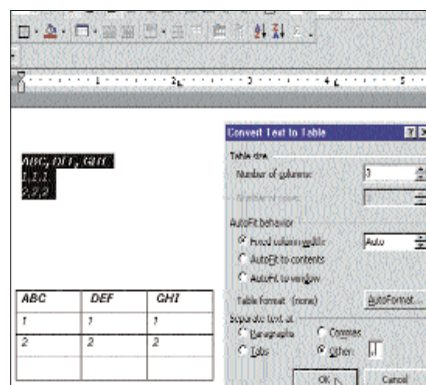
alignment by right-clicking the cell, clicking on Cell Alignment, and choosing the alignment you want.

Converting between text and table

Now let's look at a few advanced topics. The first is converting text into tables, and vice versa. To convert a table into text, select the table and go to **Table > Convert > Table To Text**. It will ask you about the character to be used as a separator; the default setting will do, so just click OK. The table is converted to text, which can be transferred to other software that do not support tables.

Similarly, you can convert text into a table. Suppose you have some text like
ABC, DEF, GHI
1,1,1
2,2,2

To convert this into a table, select the text and go to **Table > Convert > Text To Table**. In the dialog box that pops up, choose



Converting tables to text, and text to tables, are pretty easy and precise

You can decimal align a table using only the mouse, to drag columns



tre the cells. If you drag it off the ruler line, you will not see it again, and will have to start from scratch.

You can download tutorials on Word by Microsoft from <http://www.microsoft.com/education/?ID=O2kTutorial>. You can also join newsletters, which keep you updated about the latest in Microsoft Word and send you tips and tricks as well. One such newsletter, called Inside Office, from Microsoft can be subscribed to at [http://www.microsoft.com/office/using/ newsletter.asp](http://www.microsoft.com/office/using/newsletter.asp).

UPENDRA SINGHA

Sites to visit

<http://www.bcschools.net/staff/WordHelp.htm>
<http://www.microsoft.com/office/using/>
<http://desktoppub.about.com/cs/word/>



It's colourful, its funky and yes, it's Linux. Personalise Tux by changing the look and feel of your favourite window manager. Here is how you do it.

Tweaking the appearance of the Windows desktop is a breeze—a few clicks, and you can change just about everything, from backgrounds to themes. If you are new to Linux, it's about time you discovered how easy it is to be get a desktop as colourful as Windows. Sure, it may seem confusing at first, with Linux distributions coming up with variations of the Gnome and KDE desktop environments, and a plethora of window managers to control the appearance of windows within these desktop environments. But here's the interesting part—within Linux, you can tweak just about every component of the window manager beyond what any version of Windows allows.

For this workshop, we show you how to put to use two of the most popular win-

dow managers in Linux—WindowMaker and Metacity. We put these window managers through their paces on a computer with the SuSE Linux Office Desktop distribution installed.

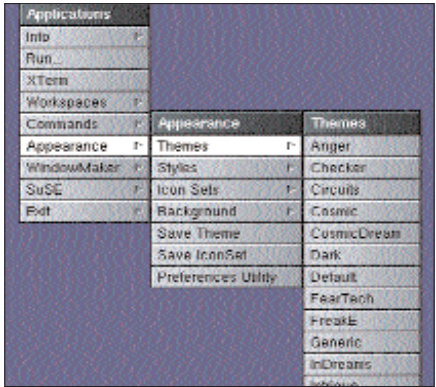
Using WindowMaker on SuSE

You can select the window manager or desktop environment right at the login screen. To use WindowMaker, select WindowMaker from the drop down box that appears at the login dialog.

The default environment and theme in WindowMaker is very different from what you get to see in your typical Windows desktop, and takes some time to get used to it. If it appears rather drab and insipid, this is how you can enliven it—click anywhere on the desktop, then, go to *Appearance* >

Themes. Experiment with the available themes listed in that menu. This should brighten your desktop quite a bit.

A theme defines the look of every



Changing themes in WindowMaker

element of the interface. You can customise individual aspects by changing Styles and Backgrounds. To do this, go to the *Appearance > Styles* or *Appearance > Backgrounds* menu. You can always save the custom look you've created using the 'Save Theme' command in the Appearance menu.



Tons of styles to choose from here

WindowMaker supports a very eye-catching feature—dynamic backgrounds! Go to *SuSE > System* and choose from a wide range of applets including 'The Matrix'—our favourite. These applets are rather tricky to get rid of—you will have to manually kill the process to stop the dynamic



You can choose Dynamic backgrounds here



The Matrix—Coming to a Linux desktop near you!



The WindowMaker control panel lets you customise appearance

effects using the 'kill' command. (See box 'Processes in Linux') Play with this feature only if you are comfortable with this command-line tool.

Finally, use the WindowMaker Preferences application to change the interface and several aspects of window behaviour. Each option is pretty much self-explanatory. These preferences can be found in *WindowMaker > Wprefs*.

Getting new themes for WindowMaker

WindowMaker comes with plenty of themes but there are always more to be found. If you would like to add in some more themes, you can get some really interesting ones at <http://alge.anart.no/projects/wmaker/>.

WindowMaker themes come in the compressed tar.gz format. You will have to extract the themes from the compressed file into the Themes directory. The default WindowMaker Themes directory is */usr/X11R6/share/WindowMaker/Themes*. Open a terminal (console) and uncompress the files with the following command: `tar -zxvf downloadedtheme.tar.gz`

You will find a directory by the name of *downloadedtheme.themed* inside your current home directory. Move this directory to the default WindowMaker themes directory by using this command: `mv downloadedtheme.themed /usr/X11R6/share/WindowMaker/Themes`

You should now be able to see the installed theme listed within the Themes pop-up under Appearances when you click on your desktop. Just click on the theme name to change into it.

Run Gnome over WindowMaker

If WindowMaker is getting boring and you are looking forward to working within the good old Gnome desktop, here is a simple work around in which you can switch desktops without logging out. Click on the WindowMaker desktop to get the standard

pop-up menu and select Run...

Type 'nautilus' in the Run command dialog that comes up.

You should see some pretty interesting changes on your desktop. The WindowMaker theme will disappear and the Gnome desktop appears, with the Nautilus file browser window that shows you the contents of your home directory. Notice that the Gnome desktop comes with its own titlebar. If you would like to access the WindowMaker desktop, close the Nautilus file browser and move the Gnome desktop around by dragging its titlebar. You should see the WindowMaker desktop hiding behind it. To access your custom theme, click anywhere on the WindowMaker desktop—that should do it. You can click on any of the shortcuts on your Gnome desktop to run the corresponding application.



Gnome running over WindowMaker

Since what we pulled off here is an undocumented hack, you may face some unexpected events such as automatic wallpaper changes.

Using Metacity

If you choose Gnome at the SuSE login prompt, the default window manager is Metacity. It's quite limited as compared to WindowMaker, but at least you'll get to change the system theme and one aspect of window behaviour. Click on the 'Desktop Preferences' icon in the taskbar (the spanner and screwdriver icon). Then double-click on Metacity Setup to bring up the configuration screen.



Use Desktop Preferences to launch the Metacity configuration utility

As you can see, there isn't too much to do here. The themes listed in the box aren't as comprehensive as the themes in WindowMaker—they just change a few aspects of windows, such as borders, title bars, etc. You can download extra theme files and install them using the 'Install New Theme' button. A little more customisation can be achieved by changing

the title bar font. The last two options allow you to determine how the active window is chosen and how many virtual desktops are available. The default is four virtual desktops.



Metacity configuration offers limited customisability

Switching into Metacity within KDE

Even if you are a Gnome fan, you might find yourself using KDE, especially with the sheer number of applications that are bundled with it. KDE comes with its own window manager, kwin, which is tightly integrated into the desktop. You could still replace kwin with Metacity, although



Two Desktop Environments running simultaneously

it is slightly tricky.

To do this, open a terminal on your desktop and type the following command:

```
ps -ax | grep kwin
```

This will give you an output similar to the one given below

```
2701 ? S 0.00 kdeinit: kwin
```

The first number gives the process ID of the kwin window manager; you can use this ID to kill the window manager by typing the following command in the terminal:

```
kill -9 2701
```

The last number in the preceding line—2701 in our example—is the process ID of kwin. After killing the win-

Processes in Linux

What is a process?

Any program invoked on your Linux machine runs as a single process or a group of processes. Every process is assigned a unique process ID that is used by the kernel to identify it. To get a snapshot of all the current processes and their process IDs, use the command `ps -ax`

Killing a Process

It's possible that a process may not terminate as expected or you may want to manually terminate a process.

To kill a process within Linux, obtain the process ID and type in `kill pid` into a terminal.

This should kill the process. However, if a process ignores the kill command and does not get terminated, you would need to enforce the kill command. For this, type in `kill -9 pid`

The -9 flag here ensures that the process is terminated, as it cannot ignore this kill signal from the kernel.

dow manager, you will notice that all the colourful borders of the opened windows have disappeared and you are unable to move them around. You can still use them—this is because the desktop is still alive and running, but it cannot figure out how to go about handling the windows since kwin, the window manager, has been killed and no other window manager is running. Now choose Run Command... from the start menu, and type `'metacity --replace'` in the dialog box that comes up. Click on Run and you will have Metacity managing your open windows under KDE.

Running KDE inside Gnome

Open the Run Command... dialog from the start menu and type `'startkde'`, which starts the K Desktop Environment inside the Gnome desktop environment. You'll get two different desktop panels, one above the other, from where you can access the start menus and applets of both KDE and Gnome. This can be of help when you need to quickly use the KDE apps straight from the KDE taskbar and start menu.

However, if you're running two desktop environments, you will need a lot of memory or else your Linux box is going to slow down to a crawl! ■

PRAVEEN KURUP AND BADRI NARAYAN

About Managers and Environments

Here's some information to help you understand the differences between window managers and desktop environments.

The X server, commonly called X, is a portable GUI used on several platforms and systems, but mostly associated with UNIX. There are several implementations of X available, with the free version-XFree86-used for Linux. X gained wide acceptance with its eleventh revision, famously known as X11.

X achieves its complete functionality through the working of several independent components, rather than a single monolithic—and thus hard to manage—structure. The most significant advantage of such a modular structure is its customisability.

The individual components of X can be tweaked and changed by users and this is where the window managers come in.

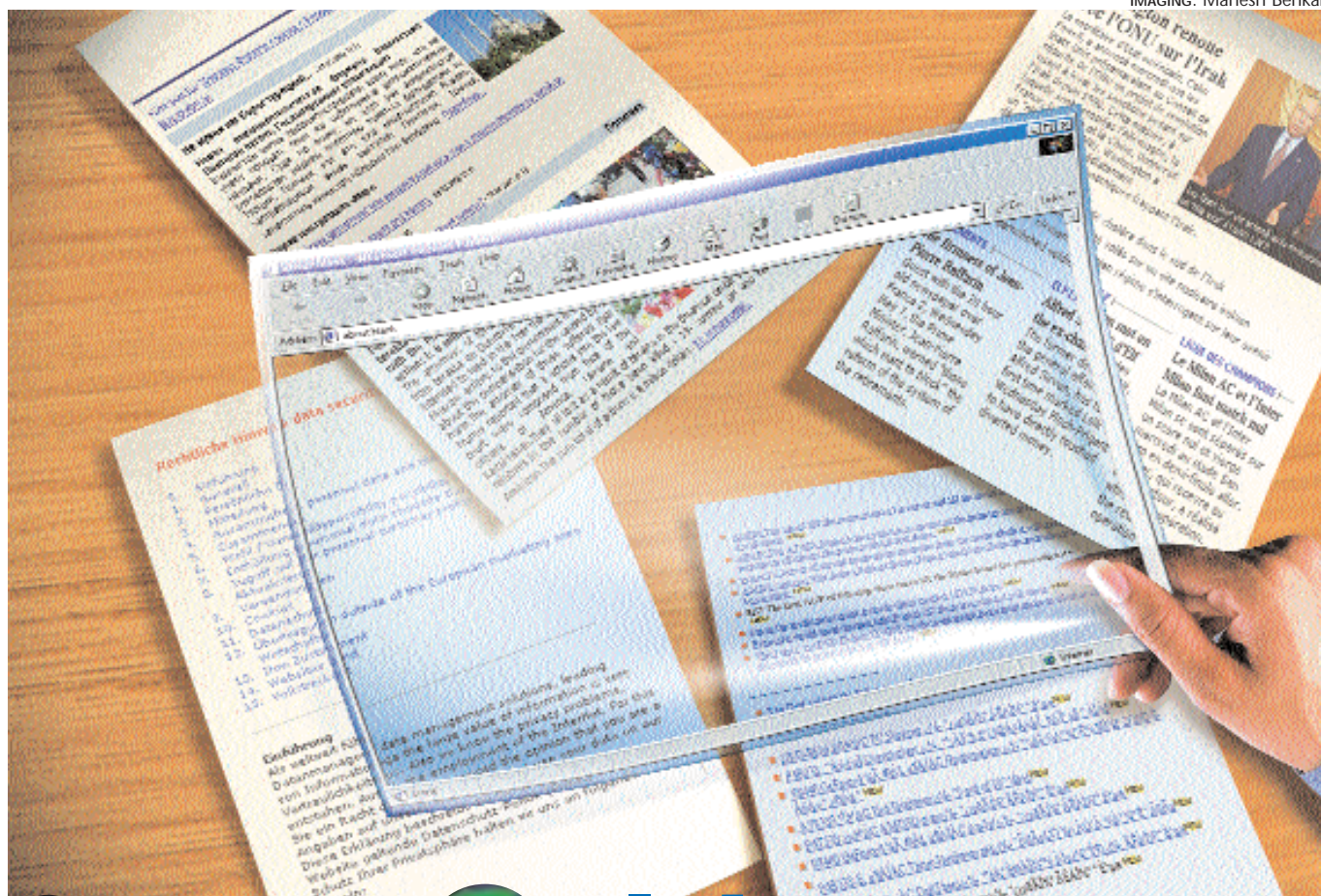
Since users can choose to change the look and feel as well as the interaction of windows, a streak of individualism can be added into what is essentially a very com-

monplace product. You could choose to implement a new style just as often as you want to!

This is where the window manager comes in. The window manager manages the windows, and provides the interface where the users can interact with various application windows and defines the look and feel of your workspace.

Desktop environments provide a complete user interface and come bundled with several applications and utilities, eg. GNOME and KDE (K Desktop Environment).

Window managers can work without desktop environments, but the reverse is not possible. This happens because desktop environments always need a window manager to manage their windows, while window managers can draw and manage their windows by themselves. Sounds like a reason to junk that heavy desktop environment? Hold on, you forgot all about those wonderful bundled applications!



One world, One language

¿Usted habla español? Well neither do we, but you no longer need to speak, read or write a language to be able to communicate using it...

“**G**lückwünsche”, the subject line of the e-mail screams. You click on it and gibberish shows up. Who wants to continue reading a mail that begins, “Ihr Stellengesuch auf Mercedes Benz wurde angenommen.” You instinctively click on Delete, and perhaps even block the sender, but had you translated the text, you would have found that the e-mail reads “Congratulations! Your job application to Mercedes Benz was accepted.” Kicking ourselves, aren’t we?

Many of us would like to talk to our Japanese correspondents in Japan, or have e-pals in Russia, but who has the time to learn Japanese or Russian?

But now, the Net is shrinking the world

in more ways than one. Web sites with translation engines bridge the language divide by offering free and paid translation services for all major languages. Small or medium-sized businesses can now avail of cheap translation solutions, and jump over the language barriers that hinder growth on foreign lands. Net surfers don’t have to miss out on relevant content they find in foreign languages.

Sites and Services

Systran Information and Translation Technologies is one of the biggest players in the translation software business, and has an admirable 30 years experience in the field. Systran’s translation engine is gen-

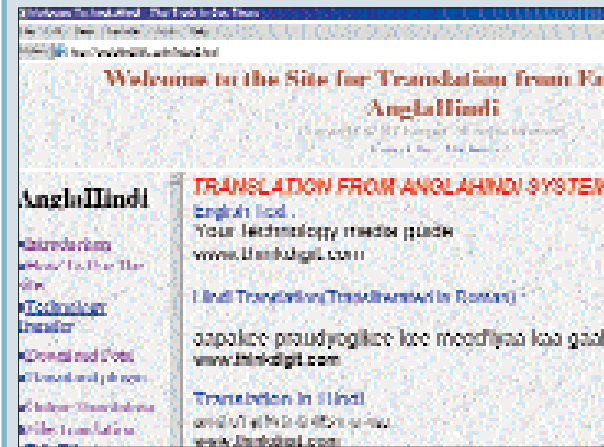
erally considered the best. Some other translation engine providers are Free-translation.com, PROMT-Reverso and WorldLingo.

Popular sites such as Google and Dictionary.com offer what is known as ‘Machine translation’, which, while not as competent as a human translator, conveys the gist of the text. For example, Google would translate that German e-mail as ‘Their job application on Mercedes Benz was accepted’—not entirely correct, but it gets the message across.

The most popular sites are obviously the ones that offer free translation. Google offers a wide range of translation services, ranging from translating text and Web

Hamara Bharat mahan!

Some IIT Kanpur students developed a translation service for translating from English into Hindi. The site is called AnglaHindi (<http://anglahindi.iitk.ac.in/index2.html>) and offers a Hindi true type font for download, in case you can't display the Hindi translation properly on your



AnglaHindi is what IIT Kanpur's attempt at translation is called

computer. It also has an online editor, which allows you to further edit and tune up obvious translation mistakes by using a pop-up Hindi font keypad. Another exciting feature is the fact that you can upload a plain text file, and have it translated within minutes. It even shows you how many sentences your file has, and shows the real time progress of the translation. Once done, it allows you to view, edit or save the translated file.

pages to searching for sites written in specific languages. It also allows you to view searches, and the Google site itself, in a variety of exotic languages, such as Japanese and Ukrainian. Adding an Indian flavour, it also supports Indian languages such as Hindi, Bengali and Marathi. Google uses Systran's translation technology for its online translation service, available at http://www.google.com/language_tools.



Google offers translation services, a small part of their extensive language services

Using translation Web sites is a snap. All you have to do is navigate to a Web site, say, www.systransoft.com, go to their translation page, and you will see a text input or a URL input box. Enter the text you want translated into the text box, choose the source and destination languages, such as English to Japanese, and click on translate, or press [Enter]. A few seconds later you'll get the translated text. The procedure is similar for Web page translation—just enter the URL of the Web site you want translated, and select the

language you want to see it in. Remember that some languages, such as Japanese, Arabic and Hindi, use a non-English script. You'll have to install the fonts for these scripts before you can view the translated output. Usually the Web site, or your browser, will inform you that a certain site cannot be displayed correctly, and will offer to install the font onto your system. All you do is click Download or OK, depending on the message you get, and view the Web page in that language.

T-Mail (www.t-mail.com) allows you to translate e-mails too. You will need to send a mail to yourself and send a copy to T-mail with the 'Cc:' address in the pre-assigned format. For example, to convert a French e-mail to English, you type fr-en@T-Mail.com in the 'Cc:' box and send the e-mail. You receive the translation as a reply. The service, however, is quite painful to use—the return e-mail is sent only after a few hours, and there's gibberish mixed with actual text.

There are also some sites that do translation between two specific languages, such as Ajeeb.com (<http://tarjim.ajeel.com/ajeel/default.asp?lang=1>), which translates from English to Arabic. Ajeeb offers its Tarjim translation tool for free, which you can download and then use to get instantaneous English to Arabic translation. However, you'll have to pay to get an Arabic to English translation.

AltaVista's translation services, is called Babel Fish—taken from the cult novel *The Hitch Hikers Guide to The Galaxy*



Babel Fish: your guide to the translation galaxy

by Douglas Adams. It can be found at <http://babelfish.altavista.com/>, and was the first online translation success story. It uses Systran's translation technologies to offer both text and Web page translation.

FreeTranslation.com (www.freetranslation.com) offers both paid and free translation. You can translate important documents as well, albeit at a price. A click of a button and you can translate anything via human translators. You can get free machine translations as well.



Dictionary.com offers so much more than just word searches

5 cool ways to use Online Translation Services

- 1 E-mail your better half in Japanese, when both of you are at work. If someone sees the e-mail, they won't understand a word. However, this only works for people who work outside of Japan, and who don't have Japanese bosses!
- 2 Conspire to overthrow your boss' evil regime by sending e-mails in German to your colleagues.
- 3 E-mailing e-pals in their native tongue to impress them. Especially if they're cute and plan to visit your country soon.
- 4 Setting up multilingual personal Web sites, to get geographically distributed hits.
- 5 Learn French words and phrases, and use them in classy restaurants, to sound more chic, especially when on a date.



Systran's translation software and services are the most popular choice for Web sites

How good are they?

We used Google, Systran, Dictionary.com, AltaVista and FreeTranslation.com to translate a snippet of a popular French song into English. We then translated the output back into French and then back into English, just to see what the sites would come up with.

The snippet in French was: "J'avais dessin , sur le sable, son doux visage, qui me souriait. Et puis, il a plu, sur cette plage, et dans cet orage, elle a disparu. Et j'ai cri , cri ! "Alline!" pour qu'elle revienne. Et j'ai pleur , pleur , Oh! J'avais trop de peine."

Here's what it means when translated by a competent human translator: "I drew her sweet face, which smiled at me, upon the sand. And then it rained on this beach. And in this storm, she disappeared. And I cried out, "Alline!" so she'd come back. And I cried, cried. Oh! I am hurting so much."

Google came up with: "I had drawn, on sand, his soft face, which smiled I. And

The languages they speak...						
	AltaVista BabelFish	Dicti- onary.com	FreeTransla- tion.com	Google	Systran	T-Mail.com
Chinese <=> English	✓	✓	✓	✗	✓	✓
Dutch <=> English	✓	✓	✗	✗	✓	✓
French <=> English	✗	✓	✓	✗	✓	✗
German <=> English	✗	✓	✓	✗	✓	✗
Greek <=> English	✓	✓	✓	✓	✓	✓
Italian <=> English	✓	✓	✓	✓	✓	✓
Japanese <=> English	✓	✓	✓	✓	✓	✓
Korean <=> English	✓	✓	✓	✓	✓	✓
Norwegian <=> English	✗	✓	✗	✗	✗	✗
Portuguese <=> English	✗	✓	✗	✗	✗	✗
Russian <=> English	✓	✓	✓	✓	✓	✓
Spanish <=> English	✓	✓	✓	✓	✓	✓

then, he liked, on this beach, and in this storm, he disappeared. And J? shouted, shouted! for the qu? it turns over. And I cried, cried, the OH! J'avais, too much pain."

AltaVista's Babel Fish translation service also uses Systran's Internet translation technology to translate text and Web pages, and thus gave the exact same output as Google.

FreeTranslation.com's machine translator came up with: "I had drawn, on the sand, his soft face, that smiled me. And then, it pleased, on this beach, and in this storm, she disappeared. And j's' screamed, screamed! "Alline!" for qu' she returns herself. And cried j, cried, Oh! J'avais, the too much penalty."

Dictionary.com offers many more languages to translate between, but our passage was just as badly translated. It came up with: "I had drawn, on sand, his soft face, which smiled I. And then, he liked, on this beach, and in this storm, he disappeared. And j’ shouted, shouted! “Alline!& #8221; for qu’ he turns over. And I cried, cried, the OH! J’avais, too much pain."

Systran's translation was the best: "I had drawn, on sand, his soft face, which smiled I. And then, he liked, on this beach, and in this storm, he disappeared. And I shouted, shouted! "Alline!" so that it turns over. And I cried, cried, the OH! I had, too pain."

You'd probably get the idea from these translations that Systran, Free-Translation.com and all the others do a terrible job. But remember that prose, especially simple sentences, get translated much better than poetry and the like. Also remember that we got the results above by translating from French to English, then back to French and back again, just in order to see how well the final translation would come out. The results are much better for a single one-way translation.

Future speak

With better speech recognition and translation software being developed, we could soon have only geographical barriers separating us. IBM is developing a Multilingual Automatic Speech to Speech Translator (MASTOR), allowing people who do not share a common language to communicate. If you have a laptop with the software loaded, you can talk into the microphone, and the laptop will translate and speak to your audience in their native tongue, and vice versa.

Technology and software that can recognise your speech, your tone of voice and mood, are also being developed. Once perfected, all we will ever need is our laptops on our travels abroad. The software will convert whatever we write, speak and hear into any language accurately.

For now, those of us who are interested in all things alien, can use the current online services for basic translation needs and wait for them to evolve. Till then, we have no choice but to live with the imperfections of current machine translators.

ROBERT SOVEREIGN-SMITH

Trekkie translation

Calling all Trekkies! There is a Web site that has translation services for alien languages from Star Trek—namely Klingon, Vulcan and Romulan. You can convert from these to English or vice versa. Now you can watch the reruns and understand what the Klingons and Romulans are saying. Try it at <http://startrek.t35.com:8000/php/entrans.php>



Translation tools that will help while navigating in space

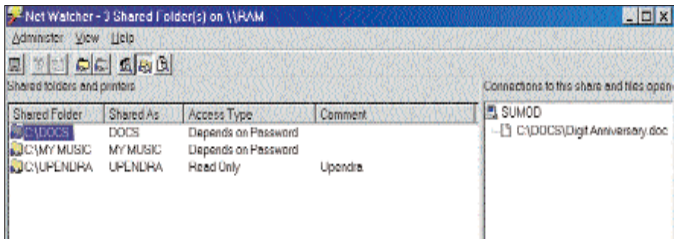
30 Minutes Expert

Watch your shares

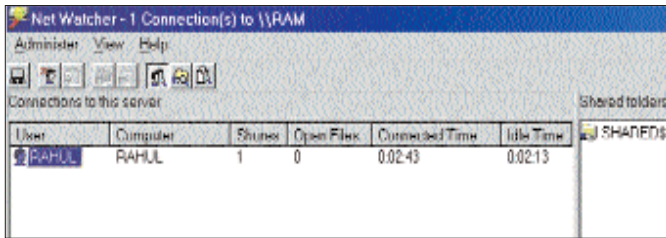
Sharing folders over a LAN and accessing other's shared folders is quite easy. If you do not maintain discipline with your sharing habits, you may end up sharing dozens of folders from all over your system. Keeping tabs on what folders are shared and who is accessing them is rather difficult, if all you have is Windows Explorer.

Windows 98, 2000 and XP all have utilities to help you manage your shared resources and track their usage. As far as the Windows file-sharing system is con-

Add/Remove Programs > Windows Setup > System Tools.



Which shared folder has the highest traffic?



Keep tabs on people picking up your files



Install NetWatcher from your Windows 98 CD ROM

cerned, there are three objects to be managed—the list of shared resources, people connected to these resources and the specific files opened, or printers used. On Windows 98, NetWatcher lets you keep track of, and manage, all three.

NetWatcher is not installed with the default configuration of Windows 98. If it is not in your *Start > Programs > Accessories > System Tools* menu, then you must install it from *Control Panel >*

When you run NetWatcher, you will be presented with a list people that are currently connected to your computer, and the resources they are using. You can select any of the people listed here and disconnect them. A forced disconnect will terminate all file transfers, or printing tasks immediately. However a disconnection does not impose a ban on that user. He can reconnect and start transferring files or printing again.

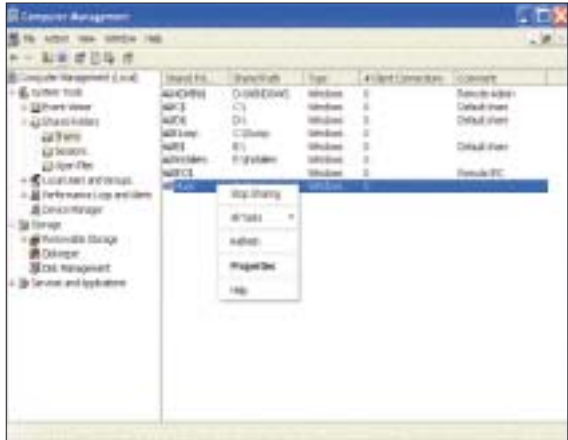
The second view in NetWatcher will show you the list of shared folders on your computer. From this view, you can choose to un-share

some of the shared folders, or share more folders. For each folder, NetWatcher will show you a list of people connected to it, and the files they are working with.

The third view shows the complete list of open files on your system across shares and users. An interesting option for people on a LAN with Windows NT or 2000 servers is NetWatcher's ability to connect to the server and display the activity on the server.

If you run Windows 2000, or XP on your computer, there is no NetWatcher application to be found. Instead, similar functionality can be accessed via *Control Panel > Administrative Tools*

> *Computer Management > Shared Folders*. The Shared Folders snap-in has no



Windows 2000 and XP offer unified computer management including shares



The global perspective on every file accessed on your computer

toolbar to perform actions, but everything that you do in NetWatcher can be done via the context menu. Right-click on any object to get a list of actions possible with that object, including disconnecting users, adding and removing file shares etc.

SUMOD HAJELA



Get your vaccinations here for bogus clock speeds, dirty fans, BIOS flashing, Linux problems, dual OS installations and much more...

Compulsory activation

Q. My PC runs three operating systems—Windows XP, Windows 2000 and Windows 98. A few days ago, during reboot, I was asked to activate Windows XP. I tried to do so online, but it showed me the error message 'Online Services temporarily unavailable'. I then formatted the old partition, and installed the OS on a different partition. After a few days, I got a pop-up box asking me to activate Windows, again. Strangely, after pressing the OK button, it never asked me to activate again. What could be wrong?

Tamilarasan



Manually activate Windows to get updates

A It seems that you have already activated your copy of Windows XP. You can verify this to be sure. To do so manually, go to *Start > Run* and type 'oobe/msoobe /a'. If Windows XP is activated, then you will get a window say that the product is already activated. If not, then you will be

taken back to the Window where you activate Windows. If you get the later window, then you can carry on with the activation process and if you have any issues getting it done over the Internet, you can contact Microsoft India's toll free number and get it activated over the phone.

Flashy BIOS

Q. I have a Pentium III 733 MHz processor on a Mercury KOB 815e FSX motherboard. I recently downloaded an update for my BIOS. As per the instructions, I created a DOS disk, copied the flash utility into it and ran it after restarting. It prompted me to provide the necessary 'File Name to Program'. Since I did not know the name of the file, I just typed the model number of the motherboard, and the name of the updated file as the source file. It made me wait for more than a half an hour, after which I had to restart again. Before the memory test, it showed an error in the BIOS. Please help.

Rejin Ravi

A Updating the BIOS is always a dangerous affair and the error you get is due to an improper update. It is advisable to take a backup of the BIOS. Also, before upgrading, make sure you have downloaded the right version for your motherboard. In your case, go to http://www.kobian.com/dl_mb_get.php for the latest version. Unzip the contents to a floppy, and configure the first boot device to Floppy in the BIOS. On restarting the machine, type the following:



Take a backup of the BIOS before updating it.

A:\AMIFLASH xxxxxx.bin or **A:\AWARDFLASH xxxxxx.bin**. Here, xxxxxx.bin is the name of the BIOS file. Press [Enter], and follow the instructions. After you are done, remove the floppy and restart the machine. This is the correct way to flash the BIOS. However, before you do this, please refer to the motherboard users manual and see if a corrupt BIOS flash can be recovered by setting any jumper on the motherboard. If it can be done, please recover the BIOS, reboot the computer and check if it is working fine. Then shut down the computer and perform the instructions mentioned above to flash the BIOS properly. If however, the corrupt BIOS cannot be recovered and your system remains unusable, then you will need to contact your system vendor to get this issue resolved.

A backup number

Q. Can you please tell me how to take a backup of my data in Tally using Nero?

Saura



To backup a company's details, note its code number in Tally

A Locate the Tally data directory manually, and copy the entire directory to the Nero window. The default location of this folder is `C:\tally\data`. Press the Burn button, and that's it.

If you wish to copy just one company and not the entire directory, then first start Tally and note down the code number shown beside the name of the company, go to the data folder and copy all the files with the same number.

Space-eating virus

Q I use a Pentium 4 system with NT and Windows 98. After using Windows 98 for a while, I get an error saying, 'Hard disk is full. Delete unwanted files or disk cleanup'. I have 367 MB of free disk space, and have installed Norton AntiVirus, but the problem persists. What should I do?

Manoj Nambiar

A Windows NT and Windows 98 use separate swap files. The default setting is set to 'Let Windows manage my virtual memory settings.' Since you are getting this error in Windows 98, what you can do is specify the amount of swap space to be used by Windows. You can do that by going to *Start > Settings > Control Panel > System > Performance > Virtual Memory*. Set the options as per your requirement. You will need to restart the computer to save the settings.



You can perform an online scan at Pandasoftware.com

Incompatible music player

Q I run Windows 2000 and use Nero 5.5 to write my CDs. The problem is that if I create a multi-session MP3 CD, the songs recorded in the first session are read by my CD player, while those recorded in second, or later sessions are not. I write at 8X speed. What is the problem and how can it be solved?

Arindam Singha

A It is quite common for CD player's to only recognise the first session, as it is not designed to handle multi-session

CDs. There are a few exceptional players that can read multi-session CDs, but most do not support this feature. You will have to buy a CD player that reads multi-session CDs. You writing at 8X speed is only going to matter if you are making an audio CD (.cda audio files) as some players cannot recognise audio CD's written at higher speeds. The core of the issue here is multi-session CD's which is not being recognized by your CD player.



ILLUSTRATIONS: Farzana Cooper

You can also clear the temporary files, cookies and uninstall unnecessary programs on the hard drive to get more hard drive space. Otherwise, you will need to get a new hard drive.

This problem can also be caused by a virus. You need to run an anti-virus check with the latest virus definitions for your software. In case you cannot update your virus definitions, you can do an online scan by logging on to www.panda-software.com.

Extension confusion

Q Can you please tell me which program can play RM extensions, as I am unable to play downloaded songs with this extension? Also, what are files with the PHP extension?

Sandesh

A The RM extension for songs refers to the Real Media format popularised by Real Networks. Either download the latest Real Player software from www.real.com, or get it from the Mindware CD we have provided. The PHP extension is used for files containing scripts in PHP language. These files are used by software programmers to design Web sites.

Online, offline

Q I use Internet Explorer 6 SP1 as my Web browser. Recently, I haven't been able to view Web pages offline. I can see the Web pages offline through history only just after disconnecting from the Internet. But, when I try to view the pages later, they do not open. I have tried reinstalling Internet Explorer but that didn't help. What should I do to view pages offline?

Jodil Davis

A To view pages offline, open an Internet Explorer window and on the Favourites menu click on 'Add to Favourites'. Select the 'Make available offline' checkbox. To update the page regularly, you can specify a schedule and also the amount of content to be downloaded for that page by clicking on Customise. Then follow the onscreen instructions. Remember this will only save the current Web page for offline viewing. You can repeat this for all the web pages that you want to save.

You can also use utilities such as WebZip or WinMHT to download, and save entire Web sites to your hard drive so that you can view them offline.

Reset your cookies

Q Whenever I try to log into the Yahoo! Messenger, it shows an error message saying, "Reset your cookies". However, my friends can log in from the same computer. What should I do?

Shantanu Bhattacharya

A The Yahoo! Messenger stores your preferences as cookies on your computer. Whenever you visit, or connect to their services, these cookies are sent back to the Yahoo! server. Some even store sensitive information, such as your password. Generally, these cookies are created and deleted automatically by the messengers, as and when required. But sometimes due to some reason, the cookies are not updated. This results in error messages. To solve this problem, you have to reset all cookies by deleting them. As you have not mentioned your operating system, you have to locate the cookies folder. To do this go to *Start > Find > Files or Folders* and type 'cookies'. Press

'Find Now', and delete all the files that are found.

Virus Attack


Q. I have a 10 GB hard disk with two partitions. The second partition has a file named win386.swp. Can I delete the file?

Another problem is that when I open the HTML files from my Web site in FrontPage, I get an error stating illegal operation. When I open the same file in Notepad, it opens showing a new line. The line appears to be some sort of VB script that I do not remember adding in the file. When I removed the line, the HTML file started loading faster. What can the problem be?

Parimal Satyal

[illegible]

Certain viruses add lines of code to files

 Win386.swp is the Windows swap file. If you delete the file, Windows will recreate it. But it is essential for Windows to have this file as it will cease to boot if this file is absent. The default setting is set to 'Let Windows manage my virtual memory settings.'

To change this, go to *Start > Settings > Control Panel > System > Performance > Virtual Memory*. Here set the option 'Let Windows manage my virtual memory settings (Recommended)' to Yes. Here, you can also specify a new partition, the minimum swap file size and the maximum swap file size.

Your second problem is caused by a virus called HTML.Redlof.A (also known as VBS/Redlof@M, VBS.Redlof, VBS_REDLOF.A and VBS/Redlof-A). It acquires control of your machine, and modifies the registry and infects all the .html, .htm, .asp, .php, .jsp and .vbs files with the line you found in your HTML file. Once a machine is infected, each e-mail it sends will be infected with the virus.

Update your anti-virus package, scan the entire hard disk and delete all infected files. If you do not have backups of the files, you will have to remove the VB script

FAQs

Unauthorised modem

2. I have an 800 MHz Processor with 128 MB RAM and a Conexant Soft 56 Kbps internal modem. I run Windows XP and Windows Me. Whenever I try to install the modem drivers in Windows XP, I get the message 'Modem is not digitally signed'. The modem drivers were working perfectly with Windows 98, and the problem started only after I upgraded the OS.

Pawan Sudedi

A Microsoft has a laboratory called Windows Hardware Quality Laboratory (WHQL) that tests drivers and digitally signs them. The purpose is to ensure that the user gets drivers which comply to a standard quality. The drivers that are provided by manufacturers along with the devices are the latest ones, and in most of the cases are not tested by Microsoft. The unsigned drivers are recognised during installation in Windows XP, due to which you get that error message. Go ahead and install the drivers by clicking on the 'Continue anyway' button. Just make sure that you download and install the latest WHQL drivers from the device manufacturers Web site as soon as they are available.

The upgrade dilemma

Q. I have a Pentium III 800 MHz, 256 MB SD RAM, Creative Vibra 128, ASUS CUV4X-E, GeForce4 Ti4200 128 MB and a 10 GB 7,200-rpm hard disk.

My motherboard manual clearly states its support for AGP 4X. But, when I connected the above mentioned graphics chipset in the AGP slot, it seemed to work in 2X mode. When I try to change it to 4X, nothing happens. I have also checked the BIOS settings, which is set at AGP 4X. The driver version is 31.00, which the latest version available from MSI. Upgrading to version 43.45 might not help as I might not be able to get the MSI tabs.

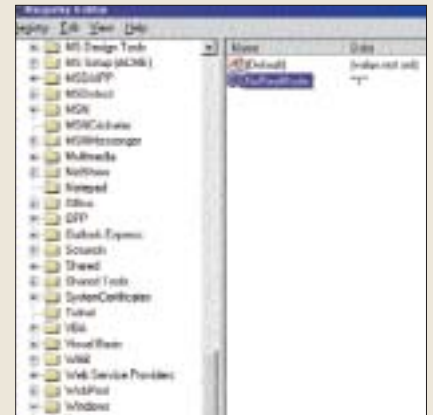
Hardik Malekar

A You are right in assuming that upgrading to driver version 43.45 may not have the MSI tabs. But that does not impair the functionality of your video card in any manner. You have not mentioned the manner from which you have concluded that the card is running in AGP 2X mode. Since, the BIOS is set to

4X, the card should run at 4X. To verify this download the latest 4-in-1 drivers from the Via Web site and install it. Configure this utility and it will show you the information about your motherboard including the AGP information.

Type mismatch

2. With reference to the January 2002 issue of Digit, whenever I type 'gpedit' in the run command, it gives the message 'Windows cannot find gpedit, make sure you typed name correctly, and



then try again. To search for a file, click start button, and then click search'.

I also wish to know how to allow and deny access to the DOS mode using the registry. I use Windows XP Professional and have an administrative account.

Gajendra S

A What you need to type is '*gpedit.msc*' (you missed out the .msc file extension). This command actually means Group Policy Editor, which controls the administrative rights for the user.

To deny access to MS-DOS Command Prompt, follow these steps:
Using Regedit find the key below:
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\WinOldApp.

Create the key if it does not exist. To do this, right-click in the right pane of the window, select **DWORD Value**, name it 'NoRealMode' and modify the value of NoRealMode to '1'. If you wish to enable it in the future, you can do so by changing the value to '0'. Note that you need to reboot your PC for this restriction to come into force.

Blurry monitor

Q I have a Pentium III 866 MHz CPU with 128 MB RAM. For the past few months, I have noticed that the display gets blurry a few minutes after I turn my computer on. This happens with all the three OS I run.

If I turn my monitor off for half an hour, I get a sharp picture for a few seconds after I turn it on again. Kindly suggest a solution.

Alip Kumar Saha

A As the problem persists in all the



three OS', the problem rests either with your display adapter, or your monitor. First, try uninstalling your display adapter drivers and then re-install them. If

the problem still persists, then get the picture tube of your monitor checked from your vendor.

amount of size. The difference in the disk consumption shown and as assumed by you is because you are not considering the size of the hidden files.

In order to check if you are indeed consuming 3.77 GB of space, in Windows Explorer go to *View > Folder Options*. Select 'Show all files' and press OK. Now go to the C drive, select all files and check the total usage of disk space by right-clicking on it and selecting Properties. This will confirm the amount of space you are using.

DirectX misbehaving

Q I have a P4 1.7 GHz computer, 128 MB DDR RAM, running Windows XP. I have a problem running my games. I tried the DirectX diagnostic troubleshooting tool, and found that there is some sort of DirectX error. When I ran the Direct3D test, a message is displayed saying, "You cancelled the test by pressing a key", even though I never touched any key. I installed DirectX 8.1 from one of the earlier Digit CDs, but even that didn't help. I tried to repair Windows XP, which solved the problem, but only for a few days. I have Windows XP and 2000, and the problem persists with both the operating systems. Please help me.

Suman

A It seems that some application is modifying settings in your computer that is preventing or disabling DirectX from functioning properly. What you can do is restore your computer using the System restore feature. Then check if DirectX functions properly, and if you are able to carry out the diagnostic tests. Then install the applications that you normally would. Check after each application or game installation, if the DirectX functionality remains. If you face this problem after installing a game, then the game is to blame. An easier way around this is to download and install the latest DirectX 9. It will upgrade your version of DirectX and also fix any corrupted, or missing files.

Send your computing problems to sos@jasubhai.com or write to Digit, D-222/2, TTC Industrial Area, MIDC, MIDC, Nerul, Navi Mumbai-400 706, and we may answer it here!

from each of the HTML files manually. If you miss even a single file, it will spread again.

Aging battery

Q I have a Pentium 4 1.7 GHz with a SiS chipset motherboard, with Windows 98 SE and 2000 installed. When I start my computer in Windows 98, the logo remains for a long time, but then the machine starts normally.

I also have another problem. The CMOS system password works until an error occurs or I restart the PC. Then it displays a message 'CMOS checksum error defaults loaded'. I think it is due to the low power in CMOS battery, even though it displays the time correctly. What can be the problem?

Shiladitya Mohapatra

A Normally, Windows loads applications after the boot up process. If your PC takes a long time to start, it is because of the device drivers and files loading in the background. You can also use the Msconfig utility in Windows to disable all background programs that may affect your Windows startup time. After you have reached the Windows desktop, perform these steps below

Click on *Start > Run*. Type 'MSCONFIG' to get a window with a title 'System Configuration Utility'. Click on the Startup tab. Here you will see a list of programs installed on your computer. These are programs that load automatically when Windows is started, and they keep running in the background. Please clear all the check boxes except for 'ScanRegistry' and 'SystemTray', then click OK. The computer will now prompt you to restart. This should help you reduce some of the

startup time taken by Windows.

Regarding your second query, it seems that your CMOS battery has drained out. Even though it shows the correct time, it will decrease over a period of time. We recommend you to replace it.

Exaggerated disk usage

Q I have a PC with Pentium 4 processor, 845E mercury motherboard, 256 MB RAM, 40 GB Seagate hard disk and Windows 2000 Professional. The problem is that my machine shows my disk usage more than it actually is, i.e., I use 2.11 GB, but it shows that I use 3.77 GB. The partition size is 9.31 GB. Can you tell me why Windows extrapolates my disk usage?

Ramprasad

A Windows is not extrapolating your disk usage; in fact, your OS is showing the exact



Remember to select hidden files as well if you want to know the exact hard disk space usage

tips & tricks



IMAGING: Atul Deshmukh

Leaving explorer behind

We dissect two of the best Web browsers that serve to tame the Internet experience: Opera and Mozilla take up the Web gauntlet and teach Internet Explorer a trick or two. With features galore, we show you how to get the best of the two

41



For Windows and Linux
Opera 7.10 with Java
Mozilla 1.3

For Windows
Plug-ins for both browsers

contents

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OPERA

Tabbed browsing, mouse gestures and a great e-mail client Opera never looked better



ILLUSTRATIONS: Mahesh Benkar

Multiple sessions

You can start your browsing experience with the same set of Web sites every time by saving those sites as a session. This done, you can ask Opera to start with your saved session whenever you boot the browser. For example, if you visit a Web-based e-mail and a few news sites, open them and click on **File > Sessions > Save session**. A session is saved with a .win extension. You can save this file anywhere, but the default location is



You can recover your crashed browsing sessions from here

advised. Note that you can always recall these saved Web site sessions even while browsing some other sites; **File > Sessions > Insert Session** will take care of this.

Next, press **[Alt] + [P]** to bring the Preferences dialog, and head to **File > Preferences > Start**, and Exit. Then click on the 'Show startup dialog' check-box. This will show the startup dialog box every time you boot into Opera. This box allows you to maintain multiple sessions and eliminates the frustration associated with a browser crash—you can start browsing at exactly the point where the crash occurred—a very useful feature.

The default path for the saved sessions is:

Windows 2000/XP: **C:\Documents and Settings\<login name>\Application Data\Opera\Opera7\profile\sessions\opera.win**

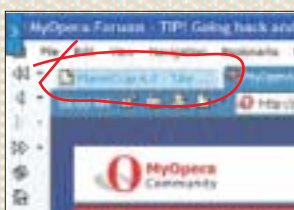
Windows 95/98: **C:\Windows\Application Data\Opera\Opera7\sessions\opera.win**

Tabbed browsing

Opera comes with a great tabbed browsing feature. To use this, first ensure that the Page Bar is enabled; **View > Page Bar > Top** should do this. Call a new tab by either pressing **[Ctrl] + [N]** or by double-clicking on an empty Page Bar area. You can also open a tab in the background by right-clicking on

a link and selecting 'Open in background page'—a better feature as it lets you browse the parent page while the link opens without disturbing you. Note that once a background tab finishes loading a Web page, the text of the tab will change colour to indicate this.

You can browse between tabs using the **[Ctrl] + [Tab]**



Done rendering background tab

combination. You can also use the mouse to do this: Keep the right-mouse button pressed and use the scroll button to move up and down the list of tabs.

Any active window, such as a tab, can be closed by pressing **[Ctrl] + [W]**. You can close all open tabs by pressing **[Ctrl] + [Shift] + [W]**. To close all tabs but the one you are browsing under, press **[Ctrl] + [Alt] + [W]**. You can also change the position of the tabs by dragging and dropping them wherever you deem them to be fit.

Clothes that make the browser

The default user interface of Opera is a space-hog but

TIP Press **F11** for the full-screen mode toggle; **[Shift] + [F11]** is the small-screen mode, for handhelds and other small-screen devices

thankfully, can be tweaked into a leaner interface. Right-click on the Main Bar, click on 'Images only', and then uncheck 'Large images'. Right-click on it again and choose Left; then disable the Personal Toolbar by right-clicking on it and selecting 'Off'. Switch off the Hotlist by pressing **[F4]**.

Go to **View > Status Bar > Bottom**, **View > Page Bar > Top**, **View > Address Bar > Top**, **View Navigation Bar > Auto**. You can drag-and-drop elements to the toolbars. We will do so for the Address Bar. Right-click on it and choose 'Customize toolbars'. You will find three tabs here, Large, Small and Fields. The last tab is where you will find search options—Zoom and Status field. Let us add the Google search field to the Address Bar. Just click on it and drag it to the bar. Note that it is a drop-down field and an especially useful search criterion is the 'Find' in page search, which highlights keywords within the Web



You can drag and drop toolbars to customise the Opera UI

page as you type in the field.

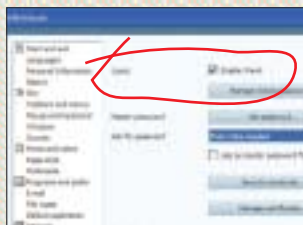
Bound together

You can create copies of the current page that you are browsing. This enables you to maintain a cloned copy of the page for cross-referencing or comparison. Right-click on a page and select 'Duplicate' or press [Ctrl] + [Shift] + [N] to do this.

Magic Wand

Logging into Web sites is a much simpler task, thanks to the Wand feature—a password and forms manager. Log in to a site and let Opera save your username and password. When you next come to the same site, the login boxes will be bordered golden. Press [Ctrl] + [Enter] at the login screen and Opera will fill the requisite personal information and automatically login.

All Wand passwords can be cleared from Delete private data on the File menu. Your usernames and passwords are scrambled by the Wand before they are saved to disk. However, for added protection you may set a master password in Opera's Security preferences. Press [Alt] + [P] and go to the Security section of the Preferences dialog box. Click on 'Set password' next to 'Master



You can enable or disable the Wand from here

password' for added security. You can also change it when Opera asks you for the password, and when it asks whether the same should be used for both the e-mail client and the Wand.

Download manager

Opera comes with a download manager (Transfers) that can pause, resume and retransfer a corrupted download. You can specify a default download directory. Press [Alt] + [P] > Programs and Paths and the relevant pane can be

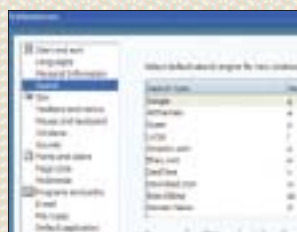


Choose a default path to download all files to

found on the right. You can also choose external programs for viewing the source code of a page, etc here. Press [Ctrl] + [Alt] + [T] to quickly call the Transfer window.

Search me

Opera supports several search engines. You can either type in a query into the search field—[Shift] + [F8]—or you can use the Address Bar to do the same. Every engine is associated with a single alphabet, thus Google gets a 'g', Download.com gets a 'w', etc. Press [Alt] + [P] and go to the Search option for



Opera supports searching from the Address bar, find the appropriate alphabets for engines here

the list of engines supported and the associative alphabet. Here, you can also change the number of results displayed per page.

To use the Address Bar for a Google search, press [F8] and precede a query with a g, eg: g X-Men movie Web site [Enter], will search for the 'X-Men...' string in Google.

Forward rewind

When viewing a page with no user forward history, Opera will try to detect a possible forward link that you can access. The Forward icon will change into a FastForward icon when this is possible. Certain Web sites, mostly forums and search engines, have a single link at the bottom that takes you to the next page of posts. Try it with a search engine to go to the Next page link, or when reading a multi-page article. It can detect link-next elements, and will perform checks to find one if not.

Press the spacebar to follow the link to the next post, or page. Rewind takes

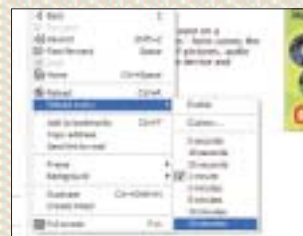
you back to a site in the history. If you have jumped from Google.com to Thinkdigit.com, you can rewind back to Google by pressing [Shift] + [Z]. Rewind takes you back a Web site, so unless you have followed more than one link at Thinkdigit.com, you can press [Shift] + [Z] to go instantly back to Google. Pressing [Z], on the other hand, would take you just one page back. Note that [Shift] + [X] takes you forward in a similar vein.

Slideshow

In a Web site that has a lot of images linked in a continuous manner (eg. a site that displays family photos or screenshots of games), you can use the Slideshow feature of Opera to enjoy the pictures better. The FastForward button displays photo files on the Web in a slideshow. To see photos full-screen on a black background, press [F11] to invoke Opera's presentation tool OperaShow.

Reload time

Opera can reload a Web site after a user-specified time. Right-click on a Web page and go to *Reload every* > *Enable*. Note



Opera can automatically reload a Web page after a set amount of time

TIP Press [F12] for quick access to preferences, such as pop-up blocking and disabling GIF animations



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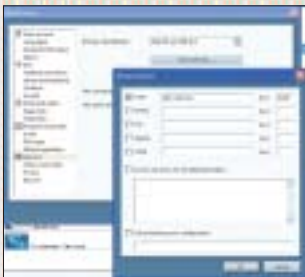
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that you can also set a custom time to reload at, say, every 2 minutes and 30 seconds. The Custom dialog box also lets you reload only if the Web page has expired (as determined by the site programmer).

By proxy
To set up a proxy server, press [Alt] + [P] > Network > Proxy Servers. Add the address and port number for the appropriate proxy server type here and make sure that the check box is ticked. You can also disable proxy for certain addresses,



Enter information on your proxy server here

such as within a LAN, and can point Opera to an automatic proxy configuration URL, if your ISP requires such a setting.

Mouse gestures
Mouse gestures are a novel way to navigate the Web using Opera. For example, you can hold the right mouse button and draw an 'L' into a Web page to tell Opera to close it. Similarly, you can hold a right-clicked mouse over a link and move the mouse down, then up to open the link in the

background window. Here are some of the gestures supported by Opera, to use them: Click and hold right mouse button, move the mouse in the indicated directions then release the right mouse button.

- **Open new document**
Move down
- ↕ **Reload**
Move up and down
- ↕ **Restore or maximize window**
Move up then right
- **Minimise**
Move down then left
- ↕ **Duplicate window**
Move down then up
- **Close document**
Move down then right, or move right-left-right

Note it down
Opera lets you keep snippets of text from Web sites as notes. For example, a particularly interesting piece of news can be saved for posterity as a note. To do this select any amount of text off a Web page, right-click and click on Copy to note ([Ctrl] + [Shift] + [C]). Notes can then be accessed by pressing the [F4] key, to invoke the Hotlist under the Notes section. You can delete notes here and create new ones as well. You can also send a note via e-mail by right-clicking on it.

The Hotlist

TIP Double-click on a blank page or press [Ctrl] + [Space] to go to your home page

The Hotlist panel is toggled by the [F4] key. It is a repository of useful stuff—Bookmarks, Mail, Contacts, History and Transfers can be accessed from

Keyboard shortcuts
Here is how you can use the keyboard to navigate and use Opera more efficiently:

Command	Key combination
Find text	[Ctrl] + [F]
Find next instance of text	[F3]
Find previous instance of text	[Shift] + [F3]
Display context (right-click) menu	[Ctrl] + [M]
Preview page as if printed	[P]
Close all pages and exit Opera	[Ctrl] + [Q]
Enter a Web address	[F2]
Paste and go	[Ctrl] + [D]
Enter nickname for fast bookmark access	[Shift] + [F2]
Go to parent directory	[Ctrl] + [Backspace]
Go to next page in history (or Fast Forward)	[X]
Go to previous page in history	[Z]
File a page as new bookmark	[Ctrl] + [T]
Save selected link as new bookmark	[Ctrl] + [Shift] + [T]
Manage bookmarks	[Ctrl] + [Alt] + [B]
Show transfers	[Ctrl] + [Alt] + [T]
Set your preferences	[Alt] + [P]
Set focus to address field	[F8]
Set focus to search field	[Shift] + [F8]
Check e-mail	[Ctrl] + [K]
Write new e-mail	[Ctrl] + [E]
Go to next e-mail	[J]
Go to next unread e-mail	[Shift] + [J]
Go to previous e-mail	[U]
Go to previous unread e-mail	[Shift] + [U]
Reply to e-mail	[R]
Reply to all recipients of e-mail	[Shift] + [R]
Recognize sender of e-mail as new contact	[A]
View all e-mail associated with sender	[E]



You can play a game like Snake here, right inside the Hotlist

here. It also provides a quick listing of all the windows open (Windows), information on the Web page that you are browsing (Info), and a listing of all the links off a Web page (Links).

If that is not enough, you can customise this panel by adding games, news pages, dictionaries, etc. To show a Web page in the Hotlist, bookmark the page by pressing [Ctrl] + [T] and select to show it as a panel. You can

Interactive Mobile Finder, Mobile Comparison, Reviews
Buyers Guide, SMS Special, Prices

Mobile

www.zdnetindia.com/mobile

find more panels, specifically designed for the slim, vertical layout that the Hotlist offers, at <http://my.opera.com/customize/panel/>.

Bookmarks

To file a bookmark, press [Ctrl] + [T], you can show the page under the Hotlist or on the Personal Bar here. You can also give a bookmark a Nickname. For example, by giving Thinkdigit.com the nickname of Home, you can enter Home in the Address bar and Opera will take you to the Web site. Make sure you do not assign a common URL such as Microsoft. A bookmarked site gets precedence over a URL. So typing Microsoft will take you to Thinkdigit.com in this case.

Manage your bookmarks by pressing [Ctrl] + [Alt] + [B]. Note that deleted ones are stored in a Trash folder. You can import bookmarks from IE, Netscape, Mozilla, etc, over here. You can also export your current bookmarks for backup or other purposes.



Assign a nickname to a Web site to visit it via the nick in the Address bar

Mail

It is possible to import e-mails to Opera's M2 e-mail client, from earlier versions of Opera, Outlook Express, Eudora, Netscape Mail (only version 6 and 7), or any mailbox stored in the generic mbox format, including older versions of Netscape. Select **File > Import > Mail** to import your e-mail. You can import different accounts, folders, settings and contacts. When importing from Opera 6, the folder structure will be copied to My folder and the imported e-mails will be saved to the Received folder.

Quick reply is useful for chat-like conversations. You can type a short text that will be appended to the top of the original quoted message. When you are viewing a mail, type your message in the text box and click on the Quick reply button. This will send the reply to all the recipients of the original e-mail.

Set up filters for My folders and Spam by right-clicking on a folder and then Properties. Click on Add filter, Boolean operators are supported—you can match your filters by components such as Sender, To header, or Entire mail. The condition can be set to 'Contains', 'Doesn't contain', or 'Matches regular expression'. When you are finished with each filter, set the filters to 'And' if your messages must satisfy all the filter terms or 'Or' if they only need to match one of them.

MOZILLA

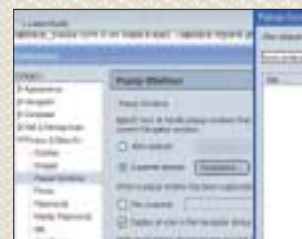
Claiming to be the fastest browser out there, Mozilla has lots of tricks up its sleeve, such as an IRC and an e-mail client



group messages from here.

Popup Windows

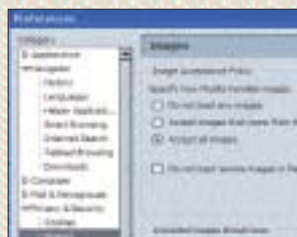
Those annoying popup ads can be turned off from **Edit > Preferences > Privacy & Security > Popup Windows**. You can also define Web sites as exceptions for both, allowing and suppressing pop-up windows. Additional-



You can specify certain Web sites, which Mozilla will allow pop-up windows for.

Image blocking

You can change the behaviour that Mozilla defaults to for images. Image loading can be turned off completely, image animations can be forced to loop once or never,



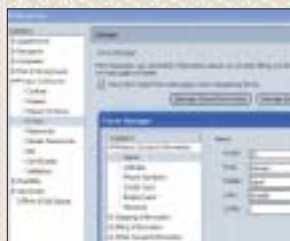
You can change default behaviour for images here

or you can specifically ask Mozilla to only load images that originate from the server you are visiting—effectively eliminating advertisements and banners that are hosted on other servers. Go to **Edit > Preferences > Privacy & Security > Images** to define such intent. Note that you can also block images in Mail and News-

ly, Mozilla can play a confirmation and can display an icon in the status bar, upon successful popup blocking.

Form manager

To better fill out forms on Web sites, the Form Manager can remember your personal information. Go to **Edit > Preferences > Privacy & Security > Forms** and click on the 'Save data from...' check box. Furthermore, you can also pre-fill personal details by clicking on the 'Manage



The Form Manager can store your personal data to better fill online forms

Stored Form Data' button. Contact information, billing details and shipping particulars can all be separate sets of data, granting

greater flexibility. After you have configured this, you can save a relevant form's data from **Edit > Save Form Info** and the saved data can be loaded by clicking on **Edit > Fill in Form**. You can select which fields to



A master password can be used to effectively lock your sensitive data

also be tagged to a timeline—useful if your PC is used by multiple users.

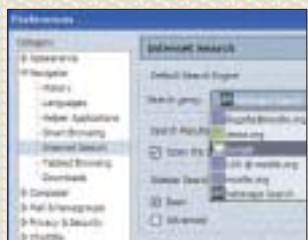
Search

Mozilla lets you perform a search on Google, amongst other popular engines. You can type the text that you wish to search for in the Address Bar. This should bring down a drop-menu from where

you can select the search engine and press **[Enter]**.

To change the engine used, go to **Edit > Preferences > Navigator > Internet Search**; you can also choose to display search results in the sidebar.

If you choose the Advanced radio button of the Sidebar Search Tab Preference, you can type in text to search

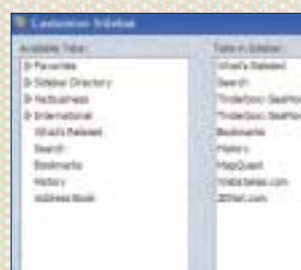


You can change the search engine from here

right into the Sidebar.

Sidebar

The Sidebar can display browsing History, your Bookmarks, and the search engines amongst other things. These 'other things' can be downloaded from <http://dmoz.org/Netscape/Sidebar/>. There, you will find calendars, games, news, and reference sites. To add something to the Sidebar, click on its name, and a confirmation window will let you complete the process. The Sidebar can be toggled on and off by pressing the **[F9]** key.

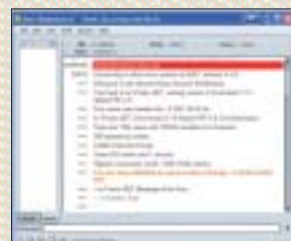


The contents of the Sidebar can be customised to suit your need

You can add, remove and change the order of entries in the sidebar by right-clicking on the bar and selecting **Customize Sidebar**.

Miscellaneous tools

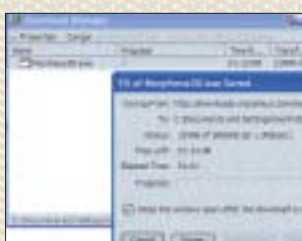
Mozilla comes bundled with an IRC client, press **[Ctrl] + [3]** to invoke it. You can choose from the default list of servers that are tagged within the client or go to a personal favourite by typing in the address in the input line below. To join a channel type **'/join xyz'** in the input line, where 'xyz' is the name of



Mozilla's in-built IRC client can be accessed with **[Ctrl] + [F3]**

the channel.

Also available is a download manager—**Tools > Download Manager**—which lets you pause and resume your downloads (double-click on a file to do this) without the need for



Pause and resume downloads, using the Download Manager

an external manager. However, it cannot split a file into multiples for faster downloads.

Proxy server

You can define your network's proxy server (if it has one) under **Edit > Preferences > Advanced > Proxies**. If your network uses a script for proxy detection and switching, you can type the address of the script file under the Automatic proxy configuration URL radio text.

Tabbed browsing

Taking a page out of Opera, Mozilla also allows opening new Web pages onto tabs.



Tabbed browsing in Mozilla is not as appealing as it is in Opera

You can play with how this works under *Edit > Preferences > Navigator > Tabbed Browsing*. Click on 'Load links in the background' to open links in the background tab. You can also define a middle-click on a link or a *[Ctrl] + [Enter]* in the address bar to open a tab by default, instead of a new window. Tabs can be navigated by using the *[Ctrl] + [PgUp]* and *[Ctrl] + [PgDown]* keys. Tabs, like any daughter window in Mozilla, can be closed by pressing *[Ctrl] + [W]*.

Save sets of tabs as a group bookmark by going to *Bookmarks > File Bookmark ([Ctrl]+[Shift]+[B])* and checking *File as group*. Now, when you go to this bookmark, all the tabs will open at once.

Multizilla is a Mozilla add-on that adds better tabbed functionality to the browser. Get it at <http://multizilla.mozdev.org/>. A stable version is slated to be out by the time you read this.

Bookmark keywords

Keywords are custom shortcuts to bookmarks. To set a keyword, go to *Bookmarks > Manage Bookmarks* (or press



Assigning a keyword to a bookmark acts as a nickname for the address field

[Ctrl] + [B]) and select the bookmark you want to set a keyword for. Click *Properties* or press *[Ctrl] + [I]* and enter a keyword for that bookmark. You will now be able to go to that address by entering its keyword in the Mozilla address bar.

Browsing on speed

Go to *Edit > Preferences > Advanced > HTTP Networking* and check *Enable Pipelining*. Mozilla defaults this to 'off' as certain servers and proxies have problems with pipelining, but when 'on', the browser fetches everything on the page in a single connection, rather than one connection per item, boosting browsing performance.

A different mail

To make Mozilla use another e-mail program, you can either install or re-install just the browser using the Custom installation method. Or you can customise the profile

file—Exit Mozilla, including Quick Launch, go to your profile folder (see the Who am I? box for further information), back up the *prefs.js* file in case of problems, and Create (or edit) the file *user.js*. Add this line to the file: `user_pref("network.protocol-handler.external.mailto", true)`.

This will open the default system e-mail program when you click on an e-mail link in Mozilla.

Exporting mail

Since Mozilla stores e-mail files in the standard plain text mbox format, almost all mail programs can use or import it. Your e-mail files are inside your profile (see Who am I?), in the Mail and (if you use IMAP) *ImapMail* folders. Each mail folder (Inbox, Sent, etc.) is stored as two files; one with no extension (e.g. Sent), which is the mail file itself (in mbox format), and one with a .msf extension (e.g. Sent.msf),

which is the index to the mail file. Tell the other program to import e-mail from the file with no extension.

If you want to transfer an e-mail file to another Mozilla profile or another installation of Mozilla, simply put the e-mail file into the other installation's Mail folder.



The Windows version of Mozilla can notify you of new messages if Mail or News is open. Go to *Edit > Preferences > Mail & Newsgroups > Notifications*

Filtered mail

You can set up filters for e-mail messages. Start the e-mail client, go to *Tools > Message Filters > New* and enter the appropriate information.

You can filter by Subject, Attachment, Sender, etc. Filtered messages can be moved to another folder, labelled dif-



Here any message from Programmers Heaven will be moved to the PH folder

ferently, deleted, etc.

Mozilla has automatic junk mail detection; something that can be helped by tagging spam messages as junk using the Junk Mail toolbar button. *Tools > Junk Mail Controls* under the e-mail client can be evoked to change spam settings.

Malicious e-mail

JavaScript is switched off by default for mail and news, so an e-mail cannot run script code just by being opened. Mozilla Mail will not allow a virus or worm to execute automatically. Attachments can be viewed without a virus being able to execute. You would need to save an attachment to your system and



Open Mail/News and go to *Tools > Import* to import e-mail messages from other mail clients

run it to cause harm, if it is a virus.

Profiles

Your profile is what Mozilla identifies you with. It contains your bookmarks, mail, news files, account settings, stored passwords, address book, security certificates and preferences. You can set-up multiple identities if others share your computer. Mozilla will boot with the Profile Manager if multiple profiles exist. Go to *Start > Programs > Mozilla > Profile Manager* to add multiple profiles.

For Linux: Open a shell prompt, cd to the Mozilla program directory and enter *mozilla -profilemanager*.

To find out where your profile is stored, look in the 'Who am I?' box.

Rescue me

If your old profile has been corrupted, follow these steps to rescue your data:

- 1. Note the name of the folder containing the old profile.
- 2. Start the Profile Manager

TIP You can export your bookmarks by pressing [Ctrl]+[B] to bring the Bookmark Manager, then clicking on Tools > Export. Import in a similar fashion

and create a new profile. Exit Mozilla (also Quick Launch).

3. Go to the profile folders and copy all files from the old profile folder to the new profile folder, allowing existing files in the new profile's folder to be replaced.

- 4. If you want to copy your form data and passwords: save some any form data and passwords in your new profile. Find the two numbered files with *.w and *.s extensions in your new profile's folder. Find files with the same extensions in your old profile folder, make copies of them and rename them so that the numbers match those of the files in the new profile folder. Copy them to the new profile, replace files.
- 5. Restart the Profile Manager and start as the new profile. The contents of your old profile should now have been successfully restored to the new profile.

Who am I?
Mozilla creates profiles for storing various settings, passwords, etc. This information is located at different places for different OSes; note that some of these files or directories may be hidden:
Windows XP/2000: *C:\Documents and Settings\[Windows Login Name]\Application Data\Mozilla\Profiles\[Profile Name]\[random string].slt*
Windows 95/98: *C:\Windows\Application Data\Mozilla\Profiles\[Profile Name]\[random string].slt*
Linux: *~/mozilla/[Profile Name]/[random string].slt/*

Keyboard shortcuts
Here is how you can use the keyboard to navigate and use Mozilla more efficiently:

Command	Key combination
Close Window	[Ctrl] + [W]
Find	[Ctrl] + [F]
Find Again	[F3]
Find Links As You Type	['] (apostrophe)
Find Text As You Type	[/]
Open search engine page	[Ctrl] + [Shift] + [F]
Open Context Menu	[Shift] + [F10]
Exit Mozilla	[Ctrl] + [Q]
Start Navigator	[Ctrl] + [1]
Start Mail & Newsgroups	[Ctrl] + [2]
Start IRC Chat	[Ctrl] + [3]
Start Composer	[Ctrl] + [4]
Start Address Book	[Ctrl] + [5]
File a Bookmark	[Ctrl] + [Shift] + [D]
Reload	[Ctrl] + [R]
Select all text in Location Bar	[Ctrl] + [L]
Open Web Page Location	[Ctrl] + [Shift] + [L]
Caret Mode (toggle)	[F7]
Full Screen (toggle)	[F11]
Zoom text Smaller	[Ctrl] + [-]
Zoom text Larger	[Ctrl] + [+]
New Navigator Tab	[Ctrl] + [T]
Switch to next Tab	[Ctrl] + [Page Down]
Switch to Previous Tab	[Ctrl] + [Page Up]
Sidebar (toggle)	[F9]

Add-Ons

VISIT [HTTP://WWW.MOZDEV.ORG/PROJECTS/ACTIVE.HTML](http://www.mozdev.org/projects/active.html)
FOR MORE ADD-ONS

MozBlog
Blog with Mozilla while you surf

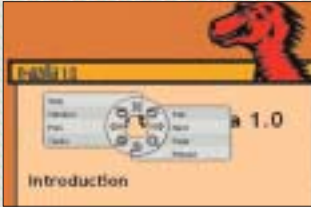
<http://mozblog.mozdev.org/>

Mouse Gesture Support

Navigate the Web using click-and-drag mouse gestures
<http://optimoz.mozdev.org/gestures/>

Piemenus

A radical way to access the



Add Piemenu to Mozilla

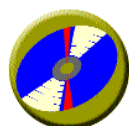
Mozilla UI, piemenus reduce mouse movements and are thus easier and faster to get used to
<http://www.gamemakers.de/mozilla/radialcontext/>

ZDNet India
Where Technology takes you

Buyers Guide, Indian Vendors, Tutorials, Install Guide, Platforms, Maintenance Tips

Server Zone

www.zdnetindia.com/server



Strike Fighters: Project 1

Iron Eagles

Strike Fighters closely simulates a flight model that will make a fighter pilot feel completely at home. There's still some hope for the rest of us flightless people, though.

The game puts you in the cockpits of jet fighters from the 1960's, such as the F-100 Super Sabre, F-104 Starfighter, A-4 Skyhawk and the F-4 Phantom I.

There are four modes of play—Instant Action, Single Mission, Campaign and Multiplayer. Firstly, a pilot needs to be created in the Pilot Record section. Here, you can choose the air force you're going to represent.

Once you begin flying, the full impact of the game's realism begins to hit you. Messages are constantly exchanged

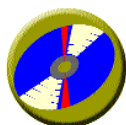


between various aircrafts and ground control. You're presented with a vast array of controls in an extremely realistic cockpit—the plane is near-impossible to control with a keyboard. The electronic tools such as radar screens, full HUD

(Heads-Up Display) and gun predictor sights *et al* are conspicuous by their absence due to the vintage nature of the planes. Thus, when we finally came across an enemy Mig, it managed to blow us into oblivion in a few seconds. Until then, we did take in quite a bit of the beautiful landscape and all the varied camera angles that the game offered. The graphics are excellent. Looking at the plane glistening in the sun is a sight you won't forget too quickly.

The gameplay and realism levels are highly customisable. Occasional crashes, and strange errors (witness a plane that never knows when to stop) mar the experience to quite an extent. Still, this simulator does its job well.

Genre: Flight Simulator ■ **Developer:** Third Wire Productions ■ **Distributor:** e-xpress Interactive Pvt Ltd ■ **Phone:** 022-28870017
Web site: www.thirdwire.com ■ **Price:** Rs 699 ■ **System requirements:** 400 MHz CPU, 128 MB RAM, 3D accelerator, 500 MB hard disk space, CD-ROM drive, Windows 9x\2000\Me\XP, DirectX 8.1 ■ **Rating:** ★★☆☆☆



Freelancer

All your credits are belong to us...

Circa 1998. Microsoft decides to team up with Digital Anvil to remake the veritable genius of *Elite* for the current generation of gamers. The result is *Freelancer*—a space-combat-cum-trading game as fine as its source of inspiration.

You play the role of Edison Trent, an intrepid spacecraft mechanic who decides to make his fortunes as a pilot for hire. Losing your ship, wealth and hope to an accident, you find yourself drawn into the midst of a government conspiracy.

Freelancer improves over the *Elite* series by including an engaging storyline. Follow the storyline, or wander off look-



ing for adventures. Accomplish missions, earn credits and advance in levels to gain access to better ships, bigger guns,

stronger shields, faster thrusters, and meaner enemies.

The gameplay is also simplified to a great extent—making navigation and ship control easy to learn. This makes the game immediately accessible to all and sundry. The game excels in recreating the universe in a breathtaking manner. Nebulae, incredible jump holes, brilliant stars, asteroid belts and great music; all conspire to distract you from the great gameplay.

Freelancer is truly one of the best experiences you'll ever come across. It has the 'just one more mission' attraction attached to it, that is the hallmark of all good games.

Genre: Space combat ■ **Developer:** Digital Anvil ■ **Distributor:** Sujata Electronics ■ **Phone:** 022-22885096 ■ **E-mail:** sanjiv@sujata.net
Web site: www.microsoft.com/games/freelancer ■ **Price:** Rs 1,499 ■ **System requirements:** 600 MHz CPU, 128 MB RAM, 16 MB video card, 900 MB hard disk space, 8X CD-ROM drive, compatible sound card ■ **Rating:** ★★★★★

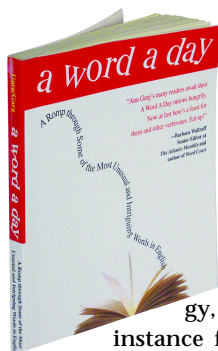




A Word a Day

Sugar-candy for word-o-philics

A *Word a Day (AWAD)* is a slim, attractively-designed volume that will be enjoyed by people who love words for words' sake. It's written by the people behind the Wordsmith Web site. To quote the cover, "It's a romp through some of the most unusual and intriguing words in English". If you are wont to be enchanted by such words as 'zephyr', just for the sound of it and the imagery it evokes, you should buy this book. Or, if you revel in knowing the correct term for something such as 'defenestrate' for 'throw out the window'. Also, if you're the kind that likes to drop a word here and there during a conversation, and then explain it to everyone around, you'll find enough material here.



The book is a collation of the most interesting of the daily e-mails sent to subscribers from www.wordsmith.org. It's organized into interesting sections much like the newsletter—words that make the spell-checker ineffective, words to describe people and so on. A typical page consists, apart from the words and their meanings, of a riot of diversions: etymology, an example of usage, an instance from history where the word was used, a story related to the word and a quote at the bottom of the page. The quote collection is also pretty good, and includes quotes from Nietzsche, Mark Twain and such.

The biggest complaint about *AWAD* is that it's a small book. It doesn't quite cut it as a reference for crossword or etymology enthusiasts—because it only talks about 327 words.

Some of the example usages seem contrived. Also, *AWAD* is not written in a style that is likely to make linguophiles out of techies: it sometimes gives the impression of having been quickly cobbled together from old pieces.

Nevertheless, browsing through it a random page at a time is fun; and when you read it like a regular book, it's a laid-back, breezy stroll through word-nuggets. *AWAD*s appeal lies in the sense of delighting in words that it gets across. However, there aren't too many who would care for such pleasures, and this makes the book unlikely to be picked up by most of us.

Publisher: Wiley Dreamtech India ■ **Author:** Anu Garg and Stuti Garg ■ **Distributor:** Prakash Books ■ **Phone:** 011-23243050/1/2
Fax: 011-23246975 ■ **E-mail:** sales@prakashbooks.com ■ **Web site:** www.prakashbooks.com ■ **Price:** Rs 149
Rating: ★★☆☆☆



Video Demystified

A detailed dissection

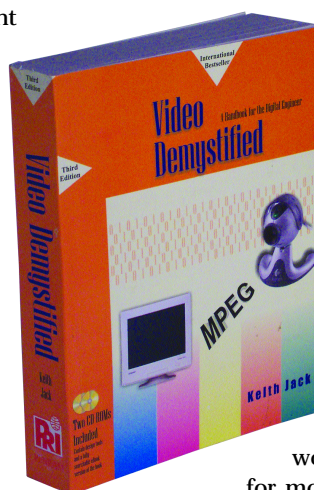
Understanding video is complex; fortunately *Video Demystified* is a well-researched book, but the array of technical intricacies covered here are just mind-boggling. That's not to say that it should be avoided at all costs, but even for an avid enthusiast, this book is far too extensive. For example, there are more than 20 pages describing and illustrating the technicalities of the different types of test signals used in video.

The book starts with analog and digital video basics, and the real world situations of broadcasting and recording. Standards and formats are discussed in detail with heavy doses of technical specifications and comparisons through tables and diagrams. The chapters covering MPEG video give a good insight

into the way current digital video and compression works.

The amount of technical data it packs makes it good reference book, rather than something you are likely to read end to end. The two CDs included contain a digital version of the text, sample files for testing your video and some other utilities.

But should you read it? If you have an interest in video or would like to experiment with it, this is a good place to get



the basics right and move onto advanced topics. The same topics covered here apply to newer techniques and standards of compression, such as DivX and Windows Media codecs. The understanding of digital video that this book provides will help you get the best out of these technologies. The author knows what he's talking about, but most of us don't want to know all the details. Simple PC-based editing applications

won't even expose you to options for most of the concepts covered here. So, if you just want to edit your first home movie on your brand new PC, give this one a skip.

Publisher: Penram International Publishing (India) Pvt Ltd ■ **Author:** Keith Jack ■ **Distributor:** Penram International Publishing (India) Pvt Ltd
Phone: 022-2462 4247/48/49 ■ **Fax:** 022-4160604 ■ **E-mail:** penram@vsnl.com ■ **Price:** Rs 550
Rating: ★★☆☆☆

Happy Birthday Two Us

We've turned two, what to do? "A hardware special," says one; "a tips and tricks special" said another; "more CDs" says a third. "How about them all?" beamed the Higher Power. So all it was, and there came to be this obese magazine with hardware at its core, a Tips and Tricks special book and three CDs on its face.

And as a special gift for ourselves, we got ourselves a real male model—just like in the catalogue, with moving arms and everything. Okay, so it wasn't as much a gift for the geeks as much as it was for the female population of the Digit team—the moment the word the spread about who was to be featured on the anniversary cover, Mexy and Mitali thought up of various professional, and highly convincing reasons why each needed to be present at the shoot.

Mexy, being a photographer, just needed to hold up her unloaded camera. Mitali, the copy editor, needed to take a vehement stand about how the editorial team never got a chance to be more involved in design decision, especially in matter of the cover shoot, more so about the models, and this being the anniversary issue...etc., etc.

And why not? For the first time, the Digit cover was graced by India's foremost supermodel, Milind Soman. While Milind began as a sportsman, he found a much lucrative career as a winner of hearts and is now in his latest avatar as a producer of a Hindi movie, *Rules-Pyar Ka Superhit Formula*. The girls watched with drool collecting in a soft pool near their feet as Ashwin, the cover designer, instructed Milind on how to handle the precious toys of the Test Centre.

Milind was quizzed on his technology preferences, his surfing habits and gadget fetishes. Answer: "I have an e-mail ID." Period. Sigh! You can't have everything.

The aftermath: A mature, professional Mexy was unable to string a straight sentence after she returned. But the cover looked great! 📷



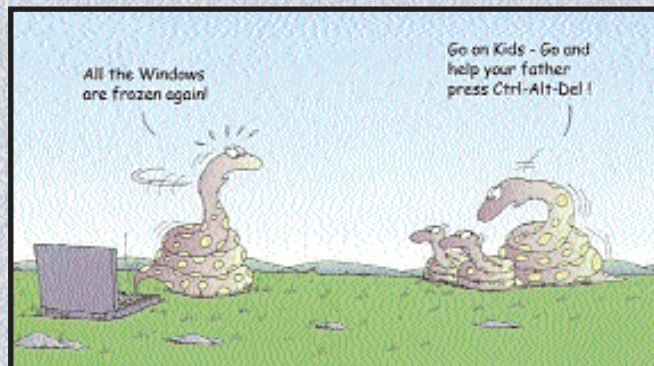
MODEL PERIPHERALS: (L to R) Ashwin Boricha, Mitali Parekh, Milind Soman, Mexy Xavier, Jiten Gandhi. Don't miss Mexy's grin!



LESSONS LEARNT: Our ace designer Ashwin teaches Milind how to handle hardware. Milind, however, failed to get Ashwin on our next cover



▲ Did you want a hard copy?



▲ A sad tail

A dogged future..?!!!

There is a story told about a futuristic 24/7 data center that runs with only a man whose job is to feed a dog that makes sure that the man does not touch the computer.

▼ Stand back!



We bring you your horrorscape...

Gemini

May 21 - June 21

As schizophrenic as you are, you sure made the right decision this time. Just the fact that you're reading this, puts you in a special group of people who were smart enough to subscribe or go out early and buy. For the rest, there's always next year and the next anniversary issue. Happy birthday to us.



Your chance to bite back!

Highlight the lighter side of computing. Mail your contributions to: Backbyte Digit, Plot D-222/2, TTC Industrial Area, MIDC, Shirvane, Nerul, Navi Mumbai 400 706 or e-mail us at backbyte@jasubhai.com

Bored at work? Here's how to have a little fun

1. Log on, wait a sec, then get a frightened look on your face and scream "Oh my God! They've found me!" and bolt.
2. Laugh uncontrollably for about 3 minutes & then suddenly stop and look suspiciously at everyone who looks at you.
3. When your computer is turned off, complain that you can't get the damn thing to work. After someone helps you turn it on, wait 5 minutes, turn it off again, & repeat the process for a good half hour.
4. Type frantically, often stopping to look at the person next to you evilly.
5. Before anyone else is in the lab, connect each computer to different screen than the one it's set up with.
6. Every time you press Return and there is processing time required, pray "Ohpleaseohpleaseohpleaseohplease," and scream "YES!" when it finishes.
7. Put a straw in your mouth and put your hands in your pockets. Type by hitting the keys with the straw.
8. Print out the complete works of Shakespeare, then when its all done, say that all you wanted was one line.
9. Sit and stare at the screen, biting your nails noisily. After doing this for a while, spit them out at the feet of the person next to you.
10. If you have long hair, take a typing break, look for split ends, cut them and deposit them on your neighbour's keyboard as you leave.